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Special Issue on Management Accounting

THERE has been an increasing awareness in recent years of the potential utilization of accounting data by management for internal purposes in the day-to-day decision-making process. Accountants in industry and in government have given increased attention and emphasis to improving and developing accounting procedures which can contribute useful information for management in establishing policies, in formulating programs and budgets, and in controlling and evaluating operations. This orientation of accounting to the internal needs of management is usually known as management accounting.

In the federal government the emphasis on management accounting is provided by the Budget and Accounting Procedures Act of 1950, Public Law 863, of August 1, 1956, and other similar legislation and by the Joint Financial Management Improvement Program, formerly known as the Joint Program for Improving Accounting in the Federal Government.

This issue of THE FEDERAL ACCOUNTANT is devoted to management accounting, particularly to its development and potentialities in the federal government. Six articles by authors in the government, in industry, and in public accounting develop several management aspects of accounting. These articles discuss management accounting generally, responsibility reporting, internal and contract audits as aids to management, and operations research. A brief excerpt is also included on the objectives of the Joint Financial Management Improvement Program.

John A. Beckett

Improving Management in the Federal Government

In recent years substantial progress has been made toward better management and control within the federal government. Financial management has been improved by the use of accrual accounting and cost-based budgets. Steps have been taken to integrate agency accounting needs and to eliminate duplication. Greater use has been made of electronic data-processing equipment to establish accountabilities and to produce meaningful and timely reports. In the general management area improvements have been made in personnel policies and training, communications, and organizational structure. In addition, studies of work measurement and work simplification have been undertaken and operations research programs have been developed. While many progressive management practices have been instituted, much work remains to be done. The responsibility for improvement in operations lies with the agency head. Since the problems facing agency managers are often similar, much can be gained by an interchange of ideas and discussion. Each manager should take it upon himself to seek out the best administrative practices and adopt them for his agency.

Mr. Beckett is Assistant Director of the Bureau of the Budget. This article was presented as an address before the Federal Government Accountants Association at Chicago in December 1959.

AS *citizens* we are all interested in the effective management of our federal government. We want to know that good management techniques are being perfected and extended throughout it, as we

are all vitally affected by its operations. More and more people are coming to realize that the successful administration of our national affairs depends upon the effectiveness of the management of our government. The great furor which has attended the recent "battle of the budget" has performed wonders in extending further into the consciousness of the American electorate the very fundamental truth that the federal government is their machinery for managing the affairs of the nation. The tremendous amount of expression of public opinion, as reflected in letters to the Congress this year on behalf of the balanced budget, has made the federal government a real and live being in the minds of unprecedented numbers of Americans.

ACTION, NOT WORDS

The subject of management is one which has, for the last several decades, been surrounded by more words and ideas than perhaps any other subject. Organizations devoted to management have sprung up by the dozens. Courses of training in management have proliferated. Many magazines and periodicals of various sorts are being published. Literally hundreds of books have been written on the subject. And countless numbers of business and professional people the country over have joined the band wagon of interest in the subject of management.

It is safe to say that out of all of this there has come substantial progress in management. On the other hand, I think it may fairly be said that for all the progress that has been made there have been innumerable words written, speeches given, and claims made. The net product of all of this has sometimes, I believe, brought as much confusion as it has clarification. I would like to suggest that it is the pay-off that counts. As practitioners in the field of management, I suggest that we are interested in deeds, not words.

In the federal government—the biggest business in the world—there has been great progress in general management and in financial management. I intend to recite for you some of the things that are going on at present which would do credit to the best industrial operations. But beyond what has been done, I hope to provide you with a suggestion of how we can all go about bringing further

progress to individual agencies and how all government employees can bring further credit to themselves.

ACCOUNTING

When any business gets too large for its manager to be able to supervise personally the whole of his operation, then that manager must look to figures as one of his main tools for administration. This means an effective and reliable accounting system producing meaningful information in comprehensible form. I need not tell you that government enterprises qualify as being too large for their managers to supervise personally. Thus it is apparent that the tool of accounting must be one of the major instruments of administrative action and management improvement in all government agencies.

With the responsibility for continuous improvement resting in agency management, all government agencies are expected to have their own facilities for improvement of financial management, including an accounting system.

Under Public Law 863, passed in 1956, Congress, among other things, directed all federal agencies to: (1) convert their accounting systems to the accrual basis, and in particular provide adequate monetary property accounting records, and (2) develop their appropriation requests in terms of cost-based budgets. These requirements, which to many an industrial enterprise in America would seem primitive enough, were established largely as a result of the recommendations of the second Hoover Commission.

Government agencies are working to establish these characteristics in their accounting systems. Some of them are well along or have completed their work, while others have not progressed so far or have hardly started. The Office of Accounting in the Bureau of the Budget has been deeply involved in promoting the attainment of these objectives.

Many of you know about the Joint Accounting Improvement Program which was started in 1948 and which is just now preparing its eleventh Annual Progress Report. This program is really a co-operative venture under which all government agencies are seeking to make their accounting services better every year.

The program is led by the combined forces of the General Accounting Office, the Treasury Department, and the Bureau of the Budget, and I can assure you this team works continuously for improvement in accounting and financial management. It holds regular meetings once each week and is constantly seeking and finding new ways and new places in which to stimulate progress.

In recognition of the breadth of its mission, the name of the program is being changed this year. Henceforth it will be known as the Joint Financial Management Improvement Program. Under this program, heavy emphasis has been placed on applying the principles of accrual accounting and cost-based budgeting. But the program has not stopped there. The team has concerned itself with matters of duplication as between agencies, integration of accounting needs, and mechanization of data processing.

The product of all this combined effort in the past eleven years is truly very substantial. Sometimes when we see how slowly individual changes are made in this tremendously large government, we lose sight of accomplishments. But the truth is that over the course of the past decade, there has been a virtual revolution in the accounting and financial management activities of the federal government. There are in operation today in most agencies of the government truly modern accounting systems, and while there remains much still to be done in perfecting the systems, we are today a long way down the path of progress toward modern accounting systems in most government agencies. In that connection, you hardly need to be reminded that the concept of controllership has been widely adopted in government agencies, and that this has brought great improvements in federal financial administration.

The mechanization of accounting and other data processing is another notable aspect of management improvement in the federal government. There are hundreds of examples, of course. Let me recite only one, as a case in point. The Bureau of Old Age and Survivors Insurance has the largest data-processing operation in the world. That Bureau has pioneered in the use of automatic machine methods for processing clerical work and is now using electronic equipment for performing a substantial segment of its total operations. It also has task forces studying electronic equipment and its applications in other aspects of its work.

During 1956, electronic data-processing equipment was installed for the purpose of posting individual earnings records. This equipment eliminated the setting up of a second summary file for the 117 million accounts which would have been necessary to retain annual totals needed because of amendments to the Social Security Act. It resulted in a one-time savings of $350,000 and an annual maintenance cost of $250,000 of the second file. Before this operation was well underway, a system was devised by which the equipment could be used to identify incorrect information, at a savings of over one million dollars a year. This, of course, is only one of many examples of the use of automatic data-processing equipment in the government. When the Bureau of Old Age and Survivors Insurance moves into its new building in Baltimore next year, it will put into operation three of IBM's largest and most modern machines for processing these accounts. This is modern management!

MANAGEMENT AND ORGANIZATION

But, of course, there is much more to management than the existence and use of effective data. Such things as personnel policy, organization improvement, work measurement, work simplification, group dynamics techniques, operations research, communications, training, and other spheres of management come to mind.

As you look at the activities going on in government agencies, you find plenty of evidence of experimentation, adoption, and improvement. For example, in recruiting college graduates to be the future managers in the federal government, the Civil Service Commission is using group dynamics. After written examinations have been given, the surviving candidates are brought together in small groups with two experienced government examiners. Some question of general public interest requiring a solution is tossed out to the group, and the individual members are asked to discuss the question and propose a group course of action. In this type of "group oral interview" the examiners observe the emergence of leadership in the candidates and discover their ability to identify the central issues, analyze them, express them clearly, lead the thinking, propose solutions, and summarize and crystallize the consensus of the group. Successful candidates become "Manage-

ment Interns" and are accorded special training and opportunities for advancement to management positions in the agencies which employ them.

Something of a management revolution has occurred in the last few years in the Post Office Department. This has affected almost every activity of the Department from the handling of a single piece of mail all the way up to the financial control of the operations of the Department. It includes a substantial decentralization of organization and the assignment of responsibilities to regional offices throughout the country. For the first time the Department has a Division of Research and Engineering staffed by competent and professionally trained engineers. The Department has built up an accounting organization of professionally trained accountants covering such areas as internal audit, development of accounting systems, and the adoption in the full sense of the word of the controllership function. In its program of modernization of management the Department has utilized up-to-date automatic data-processing equipment both at the regional and national level for the processing of financial data for management purposes. The use of modern statistical testing techniques in forecasting of work load is being pioneered. Job training has been instituted, from the beginner at the clerical level all the way up through the regional office to the director at the national level, including the sending of the top management personnel to such training opportunities as the American Management Association Conferences in Saranac Lake, New York.

The modern management tool of statistical sampling is being employed in several agencies in the government. One of these is the Bureau of Customs, where this technique is being used routinely to compute the duty applicable to whole shipments of imports from a sampling of part of them.

An example of a successful application of the techniques of work measurement is found in the Veterans' Administration's Department of Insurance. Ten years ago the Department of Insurance began to develop a measurement system which over the years has been improved and refined to the point that now it is being continuously used as a management tool in formulating Department budgets and controlling operations.

This same work-measurement system has served to point up the opportunities for improvement that lie in the utilization of electronic data-processing equipment in some of the Department's operations. Some of this application is already underway and has recently been crystallized into further definitive action by the installation of an IBM 705-III data-processing system in the VA Regional Office in Philadelphia. The usefulness of work measurement is indicated by the fact that the cost of processing veterans' insurance policies has steadily dropped in the period during which the work-measurement system has been in use.

Another example of alert management improvement is the adaptation by the Navy of the principles of what they call "automation at the source." Their people are constantly looking for opportunities to adapt office machinery at the point of the first recording of data—and thus provide for routine and completely accurate (as well as cheap) subsequent processing of the data. They have found innumerable opportunities for applying this technique and have saved substantial amounts of money in the process.

A fact you will be interested in knowing about is the existence of a Management Improvement Fund appropriated for the use of the President. Since 1953 about $900,000 has been spent under appropriations to this fund for twenty projects, predominantly administered by the Bureau of the Budget.

This is only a small picture of our government's activities in the field of management improvement and a story of some of the progress that has been made in recent years. In describing it, I do not intend to imply that all government agencies are uniformly progressive in their search for ways to improve their operations through better management. While there are many examples of progress of which government agencies can justly be proud, there is certainly room for further improvement.

A SUGGESTION FOR THE FUTURE

In calling attention to the fact that in the operations of the federal government there are plenty of examples of outstandingly progressive management practice, I raise the question: If some can do it so well, why not all? Cannot government managers seek out—in other government agencies—the very best administrative prac-

tice they can find, and, to the extent that it is useful, copy it in their own operations. Could "Operation Copycat" open the door for many new progressive steps in the operation of government agencies? A certain amount of this is going on now, of course. A few agencies are doing their utmost to learn what others are doing, and applying the very best of others' experience in their own operations.

I know of four government agencies that have done just this, lately. And others are following in their footsteps.

And why not?

Has it occurred to you that the single outstanding organization in the field and the most powerful force for promoting the principles of management—the American Management Association—*does this and this alone?* It is the means by which managers learn about the best practice of other managers. The process is not so complicated. You define and draw up a list of the problems your agency faces. These might include paper-work flow, forms design, integrated data processing, mechanization of office work, work simplification, organization, personnel administration, or any of the myriad other kinds of management problems. Then you ask yourself who else has that kind of problem, get in touch with him, and compare notes.

Not infrequently the very process of defining the problem starts you in the direction of finding a solution. And the process of comparing notes with someone else who has a like problem generally produces further progress toward a good solution. But the best dividend of this practice is that it inevitably leads to discoveries of the places from which there is much to learn. If you are looking for the best, you will find it.

This is a process that is tried and true. While one always has to be on the lookout for the danger of copying the wrong thing, experience shows that the process of seeking inevitably broadens the horizons and stimulates the imagination.

And let me tell you a secret. It will not be long till others are copying from you.

Ralph S. Roberts

Internal Audit—
Praise and Criticism

The primary objective of internal audit is that of assisting management in achieving an effective and efficient administration. Included in its activities are testing the adequacy of management controls, appraisal of existing policies and procedures, determination that policies and procedures are being carried out properly, making recommendations, and examination of financial affairs. In the course of his work the internal auditor occupies a unique position. While he is in no way responsible for operations, he has great latitude for criticism of those who are responsible. As a consequence the auditor must possess extraordinary qualifications as to judgment and capacity if he is not to abuse his position. Comprehensive operational audits are recognized as necessary and desirable management tools. If they are to be effective, however, the internal auditor must be a part of a well-co-ordinated management team composed of members who have mutual responsibilities and respect for the abilities of the others.

Mr. Roberts is Administrative Assistant Secretary, United States Department of Agriculture. This article is based upon an address given before the Federal Government Accountants Association at Washington, D.C., in January 1960.

THE subject of internal audit is somewhat controversial in Washington. In government groups one can whip up an argument rather easily by discussion of internal audit because there still exists some

deep and fundamental differences of opinion regarding its scope and capability. As with all subjects, however, this one has two sides, and it is only natural that one's position regarding it is colored or influenced by his background, experience, and, if I may say so, perhaps even his vested interest. During my thirty-one years in the federal service, I have been fortunate in the opportunity to view and work with this subject on both sides of the fence. While I would be the first to deny that I have any expertise regarding it, I have through years of contact formed some very definite opinions, some of which are critical. I hope the criticisms I have are constructive. To the extent that I voice them here, I invite you to consider them as observations of one who was associated twenty-five years ago in the establishment of one of the first programs of comprehensive internal audit in the federal government, and one who still believes profoundly in its efficacy.

Self-appraisal is good—it is healthy even for an internal auditor —if one can be objective about it. To one whose duty involves appraisal and criticism of another's performance, self-appraisal may be even more useful to keep his perspective in proper focus. I emphasize this point only because I firmly believe that the serious differences of opinion that exist in government today regarding the scope and effectiveness of internal audit result not from honest differences regarding basic concepts and principles, but rather from the manner of their application. I sometimes wonder whether some people engaged in internal audit do not become so engrossed in their review of the performance of others that they overlook the scrutiny being given their own performance by those whom the internal audit is intended to assist. The apparent failure of internal audit to grasp and understand fully the implications of its mission under today's advanced concepts of audit and to prepare itself effectively to assist in the solution of present-day management and operating problems is, in my opinion, one of the principal deterrents to a more rapid development and general acceptance of comprehensive internal audit in government.

Having whetted your appetite for argument, let me now for a few moments attempt to develop a common basis for discussion and understanding. All too frequently, it seems to me, the term "internal audit" is used synonymously for "internal control." This

broad usage is unfortunate in that it implies an intrusion on other phases of internal management. "Internal control" embraces a whole system of management devices to assure successful and efficient achievement of objectives. It includes staff and operating functions and activities designed specifically to promote operational efficiency and assure adherence to managerial policy. I am sure that those who are engaged in internal audit activities would be the first to deny that internal audit on a comprehensive basis is intended to constitute internal control. Nevertheless, the fact remains that this association does exist in the minds of many people, and it has been an adverse influence in acceptance of comprehensive internal audit, particularly by operational people. The association is unfortunate, also, because of the natural and inherent resistance of human beings to controls of any kind, especially if they appear to be unnecessary. Without acceptance by, and support of, people who have staff and operating responsibility, internal audit will continue to be looked upon as an intrusion from the outside into a sphere of personal responsibility, and thus a force to be resented and if possible defeated.

We are today living in a world that is rapidly changing, a world that is daily growing smaller. These changes in dimension are bringing about the development of new concepts and methods for the conduct of business affairs—business in government as well as in private enterprise. New developments are resulting in further diversification of activities and decentralization of authority and responsibility. Thus, there is even greater need today than there was twenty-five years ago for management aids and techniques through which policy-making and executive officials can be assured that policies prescribed are being interpreted uniformly and that the enterprise is being conducted efficiently and economically in the manner intended. Without an independent comprehensive review and appraisal, or something akin to it, management cannot know whether its decisions are being implemented adequately and are producing the desired results. The fact that such facility exists and is available to management is the important thing. The name given it is of minor consequence.

Here again, history seems to me to have had an influence on the development and acceptance of comprehensive audit in gov-

ernment. Over the decades the term "audit" has carried a financial connotation. It has been associated almost exclusively with fiscal transactions and the examination of accounting records. With few exceptions, those who have conducted such audits were trained and experienced only in financial administration. It is indeed unfortunate that, in making the transition to the comprehensive operational appraisal concept, we have not paid sufficient attention to the capabilities required to do the broader and more complex job acceptably. This is an inadequacy we must face realistically, honestly admit, and do something about. Those able to make the greatest contribution are the men and women who are themselves conducting the audit and who thus have responsibility for its image and quality.

The Department of Agriculture is a very large and complex organization. Its permanent full-time employment approximates 75,000. It is now spending in the neighborhood of six billions of dollars annually. Its functions and activities are carried out through more than 7,000 field offices and stations, and its services affect, in a very vital way, the lives of everyone of our 180 million people in the United States, as well as many in foreign countries. The diversity of its projects and services stagger the imagination. They range from the sterilization of male fruit flies for pest control, to the harvest of forest timber, the sales proceeds of which returned $116 million to the Treasury in 1959. Our forest activities are organized into regional and national forest units, the latter following natural boundaries. While the remainder of our programs are organized, in general, on a state basis, many of them have area offices for program co-ordination or administrative services. The bigness and complexity of our agriculture organization and programs, and the ramification of services rendered, demand an effective means for operations appraisal and review. In Agriculture we are dedicated to the view that this can best be done by an independent comprehensive audit or operations appraisal. We were early advocates of such a review in government, and we believe our experience over the years has served only to affirm and strengthen our position.

In the early 1940's we took action to improve audit leadership in the Department of Agriculture by setting up a small staff in the

Office of Budget and Finance to provide guidance to our agencies and services in the establishment of internal audit programs. Essential progress was made in one or two of the larger agencies having programs with substantial financial implications. However, in connection with the reorganization of the Department late in 1953, we directed that all agencies of the Department having programs of sufficient volume to warrant their own internal audit establish such an activity on a comprehensive basis with the head of such function reporting to the administrator of the agency. Early in 1954 we issued a statement on comprehensive internal audit which established general guide lines for the scope of the audit and the relationship of the internal audit unit to agency operations and to top management.[1] Recognizing the differences in size and nature of agencies and programs, latitude was provided to permit a pattern of operation that would best meet the needs of each individual agency.

We did, however, define the scope of the internal audit as a management activity within the agency to (1) ascertain for management whether its policies and procedures are adequate and properly adhered to, (2) provide management with systematic appraisals of internal controls and operating procedures and practices, and (3) verify the accuracy and reliability of the financial records and reports. We stipulated that the audit must be completely independent of line operations and other staff functions, thus, permitting the auditor to furnish management with impartial reports concerning his review and appraisal of agency policies, operations, and procedures. At the same time we made clear to top management and our operating people that full responsibility remained with operations for proper protection and use of the assets of the organization, for compliance with policies, procedures, and objectives, and for the correction of any adverse conditions found during audit review.

We recognized also that an internal audit staff did not eliminate the need for such operating and functional inspections as may be necessary in the discharge of assigned operating and staff responsibilities. This, we felt, was essential to assure our operations people that we were not expecting them to discharge a responsibility with-

[1] See *Federal Accountant*, 4 (Dec. 1954), 41–45.

out the tools at their disposal to evaluate the adequacy of their own job. This conforms to a long-established management principle that a person should not be given a responsibility without also being provided with the means of determining how well he is performing it. This is particularly important if he is to be held accountable for the results of his effort and is to be subjected to scrutiny from outside his own sphere of authority and action.

We described the primary objective of the internal audit as one of assisting management in achieving an effective, efficient, and economical administration of all of the operations of the agency. This requires, of course, the testing of the adequacy of management controls established to prevent the dissipation of the resources of the agency, the appraisal of existing procedures and policies, the determination that each organizational unit is carrying out the policies, plans, and procedures for which it is responsible, the making of recommendations to strengthen effectiveness and increase efficiency of operations, and an examination of the agency's financial affairs. From time to time, as the need has been apparent, we have supplemented our original instruction to call to the attention of internal audit staff leadership the desirability of extending their review to specific management and operating areas that were not being covered adequately. These have included, for example, review of agency programs for effective manpower utilization, and for committee management.

We are rather proud of the fact that our original statement on basic concepts and principles preceded the one issued in August 1957 by the General Accounting Office for the government as a whole.[2] We were very glad to find that our statement conforms to the general concepts and principles set forth in the GAO statement.

My own pride in the USDA statement, however, is tempered by some regret. Looking at it again in the light of experience, I sense a deficiency that is important and fundamental. I find the same inadequacy in much of the other literature on internal audit. In our zeal to emphasize the independence and comprehensive scope of internal audit, thus to assure its full effectiveness, we have ignored, unfortunately, other related management and psychologi-

[2]See *Federal Accountant*, 7 (Dec. 1957), 30–49.

cal factors that are involved. We have described internal audit's position as one of independence, as one without responsibility for operations yet with unbounded latitude for criticism of those who are responsible, as one whose success depends on ready access to the top boss. In doing so we have unwittingly set apart the comprehensive internal auditor as an omniscient being with unlimited capacity for unerring judgment no matter what may be his area of inquiry.

The literature on internal audit is replete with statements that unilaterally call for management support of the function and cooperation with the auditors in order that maximum benefit might be received from the audit. Where the reverse is true and one finds a statement of responsibilities of internal audit to management, they relate almost invariably only to procedural matters such as the manner in which reports should be prepared and handled. How much better it would have been if, in describing the functions and responsibilities of internal audit, we had emphasized its place as part of a well-developed, well-co-ordinated, management team, the members of which have mutual responsibilities to each other and who have an equal part to play in the scheme of things —particularly in management and executive interrelationships. Yes, what I am talking about involves the interplay of psychological influences, but it involves much more. It involves the qualifications of the persons on whom we are going to bestow this high esteem and great responsibility of sitting in judgment. If we are going to make a man "grow wings," let us be sure he has the knowledge and capacity to use them properly.

Sharp differences of opinion seem to have developed from time to time, also, on the position of internal audit in the organizational hierarchy. Again, I think these have been overplayed. The differences are not as great as some people seem to think. They result primarily from lack of knowledge or proper understanding of the variations in organizational structure and delegations of executive authority and responsibility in institutions and agencies that are used as comparative examples. To me, the title of the individual to whom the internal auditor reports is not significant. The functions he performs in relation to other staff responsibilities

and to operating officials should be the criteria. The nature of the business or program being conducted is also significant in the placement of this responsibility.

A survey made by the Institute of Internal Auditors in 1957 found that in a selected group of private business organizations the chief internal auditor reported to superior officers as follows:

Board of Directors	21	Controller	136
President	23	Treasurer	54
Vice President	53	Other	30

It is not particularly significant that the survey showed that in 21 business organizations the chief internal auditor reported to the board of directors and that in 136 he reported to the controller. What is significant, it seems to me, is that of the 21 cases in which he reported to the Board of Directors, 13 were banking and insurance companies. We all know how financial institutions such as these have operated traditionally. It may well be that many, if not all, of the 136 organizations mentioned represent other kinds of business enterprise in which the internal auditor enjoys just as much independence of action even though he reports to a controller. The basic principle on which we should place emphasis, and to which there should be uniform adherence, is that the internal auditor must be in a position sufficiently high in the organization to ensure independence and objectivity in his evaluations and adequate executive consideration and action on his findings and recommendations.

As I said before, we in the Department of Agriculture have tended to the belief that the internal auditor can work most effectively if he has access to the head of the agency. While he is so shown on our formal organization charts, I surmise that in day-to-day operations his contacts are more frequently with, and his reports are more generally reviewed by, a deputy administrator or an assistant administrator who performs a general executive function for the agency as a whole or for a particular phase or phases of the agency's program. This is equally true at the departmental level in Agriculture. It is the Assistant Secretary, who serves as the alter ego of the Secretary—or, if you please, the arm of the Secretary—and provides executive direction over certain

assigned programs, to whom we look primarily for the review and consideration of audit recommendations. It is his responsibility, also, for appropriate executive decisions that will implement, modify, or reject audit recommendations requiring Secretarial review. Only if a recommendation involves important public policy, or for other reasons is unusual or extraordinary in its implications, will the Secretary's personal views be sought.

In today's world of rapid change and new dimensions, government can ill afford to hide its head ostrichlike in the sands of self-satisfaction and be oblivious to tried and accepted developments that can contribute to a more effective public service. Comprehensive operational audit has been recognized as a necessary and a worth-while tool of management in private enterprise, where the element of profit is controlling.

If "bigness" in private business dictates the need for a management aid to bridge the gap between top management and the individual worker, and to surmount the kind of interdepartmental barriers that inevitably arise from strong human tendencies to develop independent operational patterns, then there is even greater need for such an aid in government. Certainly, there are few private business and industrial corporations larger than many of our Cabinet Departments and principal independent agencies.

Government has many things in common with private enterprise. Yet it is different in some important respects. These differences, in my opinion, all weigh heavily in favor of the need for a facility for independent review and appraisal of government operations. In the first place, the environment of government differs substantially from private business and this alone results in exceptional demands on government executives—demands that make it imperative that he have available the best aids that enlightened scientific management can provide. The public nature of government, expressed in the term "public interest" differentiates government importantly from private business. While "public interest" is difficult to define, it suggests that there are widely shared interests in society that transcend those of an individual, a group, or any one segment of society and that government exists in large part to promote and protect those interests. It suggests a trust or

stewardship for which government officials must make a public accounting.

Bear in mind that, having accepted this public responsibility, no action a government official takes is immune from public debate. All statements he makes and letters he writes are subject to question and inquiry. Matters of administrative detail that are personal and private in business, frequently in government become the subject of public investigation. Each employee hired, demoted, transferred, or discharged, each efficiency rating, each assignment of responsibility, each change in the administrative structure, each conversation, each letter, indeed his every act must be thought about in terms of possible public agitation, investigation, or judgment. This type of "goldfish bowl" operation does present particularly difficult problems for the government official. It tends to focus responsibility on top executives in government no matter what delegations may have been made to people down the line. In contrast, the business executive, having delegated the responsibility, can put his finger on any weakness down the line and can remove the source of difficulty without being answerable to anyone for it.

In considering the management aids which we should have at our disposal to ensure an effective public service, there is also one other important fact to keep in mind. It is that bureaucracies exist and grow in all kinds of governments, authoritarian as well as democratic. In business or in a dictatorship, the bureaucracy can be pruned because the leadership does not depend on a referendum or popular support for continuity in office. But in a democracy it is more difficult to control. There is really no effective defense against it except as management itself adopts appropriate methods. In my opinion a comprehensive operational audit, soundly and effectively carried out by people with the qualifications and capacity to do the job adequately, constitutes one of our most effective means of knowing whether this problem does or does not exist in a given agency.

Now let us turn for a few moments to a consideration of the mutual responsibilities of management and internal audit, particularly their responsibility to each other. These to me are especially important. On them rests the very health and vitality of

the audit function and its acceptance and success within the organization. They embrace, it seems to me, the crux of the current internal audit problem in government today. Here also is its Achilles' heel. With due recognition of the importance of these responsibilities and a wise execution of them, comprehensive operational audit can develop and thrive in the governmental atmosphere as well as it has in the climate of private enterprise. Conversely, if we close our eyes to its fundamental weaknesses, it will continue only the "plodding" progress that has characterized its past development in the public service.

If this function is to achieve its purpose in government, it must have the full support of top management and be "sold" to operating officials down the line as an aid that can contribute substantially to the effectiveness of their own performance. Top management must insist on the establishment of high standards to guide internal auditors in the conduct of their own work. These standards must be directed to objectivity and quality in audit findings and recommendations and to the preservation of integrity—the integrity of the officials or supervisors whose operations are under scrutiny as well as that of the auditor making the evaluation. This kind of performance demands the attention of a highly qualified, professional audit group. It requires more than good accountants, as important as they may be to the success of the effort. Other competences and qualifications are also essential. Management must be willing to foot the bill for people with adequate qualifications and capacity.

Having been provided with the resources for a qualified professional staff, and the necessary latitude and organizational environment within which it can operate effectively, internal audit has an equally important reciprocal obligation to management. It is regarding this that I find the greatest amount of criticism and "carping" among those who have executive and management responsibilities today. It is here, also, that I am afraid we, who have carried the responsibility for establishment and implementation of comprehensive audit, have been lacking in our discernment of the job to be done and the capacity of those selected to do it.

For the sake of a better brief description I use the term, "the audit personality." It involves the composite image of the internal

auditor to whom we are asked to assign this very large and comprehensive responsibility today. On analysis, what is his background and experience? What are his qualifications? What is his professional stature? We are giving him broad responsibility and expecting of him sound advice and recommendations on a wide range of activities and services that demand a knowledge of the agency's purpose, objectives, policies, and operations; a thorough background and understanding of budget, fiscal, and accounting procedures; an analysis of legal and regulatory requirements; training in technical aspects of some phases of operations; and a well-rounded background in business practices generally. Under these circumstances is it fair to him, and to management, only to substitute a "snorkel" for the quill pen he has used in the past? Can we expect management and operating people to accept happily and with good grace the findings and recommendations of a man whose background and experience is obviously not adequate to the task required of him? Can we rightfully expect people busily engaged in operating and management tasks to endure with long suffering the frustrations and time-consuming discussions that flow from audit findings or recommendations borne from lack of understanding of the real problem involved or of illogical thinking? Should we expect a comprehensive operational review involving a wide variety of expertise and management disciplines to be performed adequately by a person or persons with limited experience, schooled only in accounting, or whose sole background has been the conduct of the limited fiscal audit long associated with government activities? Probably this situation is an inherited one associated with the transition from a limited fiscal audit to a comprehensive operations appraisal. I hope that that is so. But speaking very frankly, I also surmise that it is due, in part, to the failure of internal audit leadership to understand fully the implications and management ramifications of the problems they are grappling with and their failure to have on their staffs people with the competences and capacity to see themselves through the eyes of experienced management, and formulate their findings and recommendations accordingly.

This is a pretty severe indictment and I do not expect all of you to agree with me on it. I do not intend it to apply generally

throughout government. Instances are sufficiently prevalent, however, that the problem should be a matter of concern to all who are interested in the effectiveness of internal audit. In the Department of Agriculture we are attempting to meet this problem in two ways: (1) We are assigning to our internal audit staffs a selected number of persons who have been trained and have had experience in general management and scientific fields; these people become members of audit teams formed with specific jobs in mind that require the special competences they possess. (2) In the recruitment of new employees for assignment to audit work, we are trying to give particular attention to those who have an operating background and experience even though accounting may be their specialization. I am sure some other agencies of government are adopting these same approaches.

In the March 1959 issue of the journal of the Institute of Internal Auditors, W. J. Lehmann, on the President's page suggested that internal auditors widen their horizons. In doing so, he said:

> We internal auditors have often been told...that if we are to aid our managements in directing our businesses, we must think like managers. To many of us this idea sounds fine, but we find it difficult to accomplish. Just how do you begin to think like a manager? Well, of course, one way to do it is to give considerable thought to management's problems and to ascertain whether you can aid in the solution....
>
> Perhaps you are handicapped because you do not have a wide enough knowledge of many matters in which your management is interested. In this event, perhaps, you would do well to make a more intensive study of your own business. In doing so you might broaden your knowledge about some of its principal activities....
>
> In addition, some other activities you might try to learn more about are industrial relations, budgeting, marketing, credit policies, and insurance. Your business managers have a working knowledge of all of these activities, so if you wish to be more helpful, perhaps it would be advisable for you to increase your knowledge regarding them.
>
> Certainly widening your knowledge of your own business and its activities should assist you in trying to obtain management's viewpoint; in other words, to think like a manager.[8]

[8] *Internal Auditor*, 16 (March 1959), 5.

I think Arthur Kent, a retired official of Standard Oil and Lockheed Aircraft, summed matters up pretty well on this point, when he said:

I have heard operating managers complain that the particular findings of an audit were correct up to a point; but that the auditor had quite evidently not familiarized himself with the practical everyday problems of the department, and of its big major responsibilities to management. Hence, they said unfair inferences were set up. The manager believes that his department is carrying out the big job it has been given to do. He may agree that some things you have found are not up to par, but he wants you to give them their proper relationship to the overall job. . . . If the auditor has failed in this respect, I agree with the manager's complaint.[4]

We have taken from private business the best of internal audit they have to offer. Let us be sure that in its implementation we do at least as well as they do.

[4]Arthur H. Kent, "Internal Auditing Is an Appraisal Activity," *Internal Auditor*, 16 (Sept. 1949), 34–48.

Chester Knutila

Precontract Audits as a Tool of Management

The work of the contract auditor is performed after completion of the contract. His function is that of review of actual results in light of the rigid framework of standard practices. As a means for achieving better management of contract administration, it is suggested that the auditor's traditional role be broadened to include preaudit review at the time of negotiation. If the auditor becomes a member of the negotiating team, those responsible for decisions as to the final definitive contract will have a better understanding of the obligations resulting from the proposed agreement. As a result, peculiarities and problem areas can be anticipated better and terms and conditions which are equitable to both parties can be reached.

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THE government auditor's traditional role in connection with contract audits is that of an "undertaker." He plays no part in the determination of costs and conditions peculiar to each contract, but must fit the actual results obtained to the rigid framework of standard practices and procedures prescribed by his agency and to the usually general terms of the applicable contract.

The evolution of the auditor as a member of the contract administration team and as a part of the management of government contracts can be significantly strengthened by the assignment of

auditors to audit reviews of contract proposals prior to the actual negotiation of terms and conditions with prospective contractors. Reasons supporting the assignment of auditors to such reviews can be stated briefly as follows:

1. A precontract advisory audit report would eliminate the bulk of contract problems peculiar to a given contractor. Too often such problems rise to the surface only after the contractor has operated under standard contract language for six months or a year. This necessitates extensive renegotiation to cover the peculiarities with appropriate contract language.

2. A precontract advisory audit report, presenting a comprehensive, yet concise, statement of the prospective contractor's financial and operating procedures, not only would prove beneficial to contract negotiation, but would, additionally, serve as a useful tool of day-to-day administration of the contract.

3. Auditors, by training and experience, are generally the best-qualified agency personnel available to determine whether a prospective contractor's cost-collection methods are capable of producing reasonably reliable contract cost data. Auditors are also qualified to determine whether a prospective contractor is financially capable of performing the proposed work.

4. The precontract audit would provide a firm base for future audits of the contractor's operations. Programming would be slanted to the peculiarities of the contractor's system, and much audit time could be saved by eliminating "canned" audit steps not applicable to the given situation.

5. For fixed price contracts, a precontract review of the elements of costs included in the proposal would minimize the inclusion of those cost elements not related to the work to be performed. Such a review would also help in eliminating terms and conditions that might prove inimical to the best interests of the government.

The role of the government auditor is an ever-expanding one, and the additional duties involved in precontract audits should serve to enhance his contribution to government service by utilizing those skills which are peculiarly his. The use of auditors to perform such audits can result in significant savings to the government through the application of their specialized knowledge

before the government is committed instead of after the fact, which is too often the case at the present time.

Auditors should be able to establish the veracity of cost elements, such as direct labor rates, overhead rates, general and administrative expenses, and other costs and point up those areas where problems may occur. They should be able to make such determinations without wasted effort and without lengthy discussions with the prospective contractor's key personnel.

By reviews of organization charts, account codes, operating manuals, and other procedural data, the auditor will develop a feel for the pulse of the contractor's operations. This can result in pinpointing the conditions peculiar to the contractor's operations and should result in contract terms which recognize such peculiarities and provide for their inclusion or exclusion from contract costs.

The United States Air Force has recognized the effectiveness of audit support to the procurement function by stressing the importance of the auditor as an active and effective member of the negotiating team. (See *Hearings before the Committee on Finance, United States Senate,* H.R. 7086, June 2 and 3, 1959, pp. 48, 49.) Precontract audits as a regular part of the government auditor's duties should prove to be a significant step in the evolution of the auditor as an important member of the contract administration team.

Until regular procedures for precontract audits are established, the type of assignment contemplated herein should be limited to senior auditor grades and above, and to audit personnel who have had extensive experience in dealing with varied contractors and situations. The auditors assigned to such duty should demonstrate an ability to deal with all levels of contractor personnel and should approach each review with imagination and an objective outlook. If audit reports are available from other agencies, they should be utilized and discussion held with such agencies to pinpoint those problems which may occur. The acceptance of a contractor's methods blindly, because of previous government operations, can result in knotty problems. These can be avoided by precontract reviews.

By making the auditor a member of the negotiating team, with

full power to enter into discussions, the person charged with negotiating the final definitive contract will have a complete, comprehensive, and useful understanding of what is involved in entering into the proposed agreement. The auditor can support the negotiator in obtaining a contract which contains terms and conditions equitable to both parties and one which clearly defines peculiarities and problem areas.

Joseph Pelej

Management Accounting in Industry

Accounting can no longer be merely a historical accumulation of financial facts. The pressures generated by the increasing growth and complexity of modern enterprises have required that the accounting process be expanded so that it may serve as an effective management tool. In order to achieve most efficient and economical utilization of manpower and facilities, management is very much concerned with planning and control. The primary purpose of accounting should be to assist management by supplying the kind of information necessary for planning decisions and establishing the accountabilities required for adequate control of operations. Specifically, it should provide a means for management to determine (1) the extent to which established plans and objectives are being met, (2) the efficiency of performance, and (3) the responsibility for performance in accordance with established goals.

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MANAGEMENT accounting is the result of an evolutionary process, running parallel to the changes in management philosophy and management techniques which in the last two decades or so have assumed an almost revolutionary character. In the

earlier stages of our industrial development, management was primarily concerned with production and distribution in a scramble for more profits, expansion, and at times mere survival. In those days, accounting was hardly more than a score-keeping process of limited interest to the men who ran the business.

Today we see an entirely different picture. Management has come to recognize that the tune can no longer be played by ear. Consequently, administrative people, and notably accountants, have grown immensely in stature, and some with outstanding abilities have become senior members of management and are heading great industrial enterprises.

Accounting remained for a long time essentially historical in character, concerned almost entirely with the recording of past transactions in conventional accounts and with the production of financial statements designed principally to give an account, in conventional financial terms, of management's stewardship. However, as industrial development progressed, it became increasingly evident that historical accounting made little, if any, contribution to the solution of the many problems with which management was being confronted. Forward-looking accountants recognized that a new approach was needed, and under their leadership there evolved a new concept of the accounting function which in more recent years has come to be known as management accounting.

NATURE OF MANAGEMENT ACCOUNTING

Management accounting has been defined as the presentation of accounting information in such a way as to assist management in the creation of policy and in the day-to-day operation of an undertaking. To this definition I should like to add two words—efficiently and profitably. Under this concept, accounting looks ahead rather than only into the past. To do this it must be management oriented, which means that its objectives should be directed toward helping management to determine (1) the extent to which established plans and objectives are being met, (2) the efficiency of performance, and (3) responsibility for performance in accordance with established goals. Shaping the accounting function into this powerful management tool, however, is impossible without the proper attitude of both management and the accountant.

Management must be willing to accord the accounting function proper recognition in the organization, give the accountant adequate stature, and generally provide what has been called "the management climate" to enable him to function effectively in management's interest. On the other hand, the accountant cannot expect recognition unless he himself becomes management oriented. There is no question that the historical type of the species is obsolete. Industry today demands of the accountant not only that he be skilled in accounting techniques but that he be capable of management thought and action. The accountant must understand the operations of the company and the objectives of its management, keep in close touch with the men who operate the business, and gain their confidence and respect, which he can best accomplish by being alert to the operating men's needs for the type of information that will help them. Unless management appreciates what a properly oriented accounting function can do for it and unless the accountant becomes management oriented, progress toward creating an effective management tool becomes impossible.

In its practical application, management accounting consists in essence of the careful co-ordination of accounting techniques to planning and control—two cardinal aspects of industrial management—with emphasis on the most efficient and economical utilization of manpower and facilities. A representative of top management recently said that "planning cannot be daydreaming, wishful thinking and dealing in unrealistic ideas. Planning involves realism, hard work, constant re-evaluation and dynamic action." In short, it must be based on sound, hard facts. Many of the facts which form the basis for sound short- and long-term planning should be at the disposal of the accountant, and where that is indeed the case the accountant is generally an important member of the planning team.

One of the essential requirements to proper planning is an adequate accounting system. It is the accounting system which should yield much of the data on which management must base its decisions and conclusions concerning future operations. The system, therefore, should provide the means for a meaningful classification of all revenues and expenses, assets and liabilities, and the transactions therein in appropriate accounts and subaccounts,

with proper identification of their sources and with due regard to the company's organization structure. This is accomplished by a well-designed chart of accounts along organizational lines and the establishment of appropriate account groupings. An account arrangement which is so poorly planned as to permit unrelated figures to be grouped in the same category; which has no relationship to organizational lines and the departmental setup and operations in the classification of revenues and expenses; which requires endless account analyses to get at business facts that should be readily obtainable from the records; which is not supported by a clear definition of the nature of the items to be recorded in the accounts; and which does not permit the preparation of statements, reports, and tabulations of vital business statistics without time-absorbing reclassifications—to mention only a few of the most commonly encountered defects—renders the accounting system for planning purposes practically worthless and the development of an effective control system virtually impossible.

Another essential requirement is the adoption of sound and up-to-date accounting practices. Accounting information, so-called, based on unsound or antiquated practices will invariably lead to unsound conclusions and decisions. What constitutes sound accounting practice is a matter on which there is by no means general agreement. As to industrial accounting practices, however, the trend is strongly in the direction of greater clarity of basic accounting concepts, greater uniformity of application, and, most important of all, greater adaptability to the needs of management in the operation of the business.

MEASUREMENT OF PERFORMANCE

The most urgent need of modern management is a suitable method of control, a system which furnishes management with simple means for evaluating, appraising, or measuring the performance of individuals, of departments, or of the organization as a whole. Since the ultimate objective of management control in industry is efficient and profitable operations, the ultimate question to be answered is: What did we get for the money we spent? When it comes to the expenditure of funds for whatever purpose, be it payrolls, purchase of materials, acquisition of new facilities, and

so on, effective control is not so much concerned with the *amount* of money spent but with the *effectiveness* with which it was spent. This means that, in a management-oriented accounting system, it is necessary first to give expression to anticipated performance in terms of yardsticks or standards against which actual performance can be measured, and second, so to organize the assembly of the factual data concerning each operation that results can be recorded and reported to make this measurement readily feasible. This concept of measuring performance stems from the realization that the conventional historical accounting systems which only yield comparisons of historical results of one period with those of another are inadequate for telling management the full story. It is not enough to know the actual results. At best they only indicate whether performance in one period was better or worse than that in another, but they do not indicate whether it was good or bad.

There are numerous techniques by which these measuring sticks are developed and applied in industry. Their nature depends entirely upon the needs of the individual company and ranges from fairly elaborate systems for large and diversified companies to a simple set of easily developed and easily applied standards for the smaller company. The principles and objectives are the same in either case. The task of establishing these measurements calls for maximum co-operation and active participation of personnel and department heads at all levels of managerial or supervisory responsibility. In the larger companies, the assistance of technical personnel and methods analysis is also required.

In general, there are two approaches to measurement development. The historical approach has many serious disadvantages, the most important of which perhaps is that measurements based on past experience are influenced by the inefficiencies of the past, and their use may therefore easily lead to serious inequities through penalizing the efficient operator and permitting the inefficient one to perpetuate his inefficiencies.

The best measurements are recognized to be those which are based upon objective analyses with a view to ascertaining best performance under a given set of circumstances. These so-called engineered standards are developed through time and motion studies, job analyses, work-load studies, calculations of manpower require-

ments, and so on. The important thing, however, is to make certain that everyone concerned understands how the measurements were produced and that they are regarded as fair and equitable by those whose performance they are intended to measure.

This concept of performance measurement forms the basis of budgetary control in private industry. It is an integral part of management accounting. It takes cognizance of the fact that what we today call management embraces every level and area of authority charged with responsibility for carrying out some part of the company's program. It includes not only the top executive group but the successive levels of authority in sales, production, general administration, and in fact any area where effective planning and control are required. An effective budgetary control system must be based on a sound plan of organization in which each department and administrative group clearly understands not only the objectives of its particular activity but also their relationship to the objectives of the company as a whole. Departmental relationships, lines of responsibility, and spheres of authority must be clearly defined and logically assigned. The preparation of an industrial budget is a collective effort which is important in gaining acceptance on the part of managers and department heads of their responsibility to perform in accordance with established plans. The industrial accountant's principal contribution in the preparation stage of the budget is that of consulting with department heads, supplying them with essential data; co-ordinating departmental plans, and integrating the various sections of the budget with company-wide objectives.

After the budget has become operative, management's interest centers upon evaluation of performance and explanation of the variations of actual from anticipated performance. This evaluation must be made from realistic viewpoints which take proper cognizance of the plans established for the unit whose performance is being evaluated and the nature and extent of its operations, the objective being to segregate the variances for the unit as between those components which can be traced to inefficiencies or deviations from established plans caused by decisions of its own supervision and those which have been caused by outside influences or

inefficiencies of other units of the company or by decisions of top management.

From the viewpoint of good control, this analysis should, of course, not be the sole responsibility of personnel in the department whose performance is being evaluated. The prevalent practice is to delegate this task to the accountant. To discharge his function successfully, however, the accountant should not also be charged with or assume the responsibility for taking action or for effecting the desired improvements. His is the task of disclosing, reporting, and making his facilities available in furthering such corrective steps as management may decide to take.

Control functions extend, of course, to many other areas, among which facilities, materials, and inventory control are the most important in many businesses. In industry this control function is concerned not only with efficient procurement but with efficient usage. The objectives of the materials and inventory control plan in industry are (1) precluding, insofar as possible, waste and fraudulent use of the materials and (2) providing adequate quantities of raw materials and finished goods to ensure uninterrupted flow of the manufacturing and maintenance operations and adequate customer service without accumulation of excessive inventories.

CONTRIBUTIONS OF OPERATIONS RESEARCH

In dealing with the inventory and materials control problems, including how much to buy and when, industrial accountants have in the past resorted to varying techniques, most of which fall into the "sound business judgment" category. In recent years, however, the scientific methods of operations research have provided accountants with powerful tools to produce results which could not be obtained by the earlier conventional means.

In its practical application to business problems, operations research is the name for the scientific analysis and evaluation of all the factors having a bearing upon a given business problem and the establishment of basic relationships between them so that mathematical methods can be used in developing the best solution (or optimum, as the technicians call it). The practical effect of this approach in business is the elimination of all or much of the guesswork involved in developing information upon which man-

agement must base decisions of vital importance to the business.

By utilizing these mathematical techniques in inventory management it is possible to make an objective determination of the proper inventory quantities, proper reorder points, and reorder quantities and to maintain a reasonable balance between the various costs involved. Companies which have applied these new methods have often been able to effect inventory reductions from 15 to 30 per cent. These reductions have had no effect upon the efficiency of customer service nor did they increase the risk of interruptions of production processes because of material shortages. Considering the fact that carrying costs, in terms of tied-up working capital, cost of storage space, cost of materials handling, insurance, and taxes, average 20 per cent of inventory values, the immediate dollar-and-cents savings have in many instances been substantial, not to mention the additional economies, such as reduction in obsolescence, which cannot be readily evaluated in terms of dollars.

Inventory control is only one area where the application of operations research methods is producing greatly improved results. Other areas are warehousing and transportation, sales forecasting, production scheduling, selection of proper samples in large-volume processing, distribution costs, and several others. While conventional good business judgment methods have in the past produced sound, logical answers to most of these problems, with the assistance of these mathematical techniques the best former answers can normally be improved. That improvement is sometimes only 5 to 15 per cent, but often much more. But small as it may be percentagewise, it can often mean the difference between a moderately successful and a highly successful operation. These new techniques present new and difficult problems for the accountant because experience already shows that much of the information needed to supply management with these improved solutions is simply not available through operation of even some of the best-designed present-day accounting systems. Many thoughtful accountants concerned with keeping the accounting function attuned to the needs of management believe that a new or at least drastically modified concept of record keeping may be necessary before this information does become readily available on a reliable and routine basis.

COMMUNICATION WITH MANAGEMENT

Whether or not a system of accounting is truly management oriented can best be judged by the traffic in the communication channels between the accountant and top management. This traffic may be in one direction only, usually from the accountant to management, and the vehicles may be of the horse-and-buggy type. On the other hand, this traffic may move briskly in both directions with vehicles carrying requests for more information and others conveying information in a streamlined fashion. It is obvious which of these two situations indicates the management-oriented system. Although communication is a frequent topic of discussion and a subject of many articles and speeches, much remains to be done in many organizations to develop a modern, adequate, updated communications system to meet the requirements of present-day management. Because most of the practical value of the accounting function to management depends in the final analysis on good communication, an ever so brief and incomplete discussion of management accounting in industry should at least highlight some of the principal features of good accounting communication.

When the subject of accounting communication with top management is mentioned, most people visualize the written report. Important as reports are, oral communication is equally important, if not more so. In order to make effective use of oral communication, however, a good accounting executive must free himself of enough routine matters and detail in order to be at all times available for communication. Oral communication takes two general forms—individual conversation and conferences. The larger and more complex a business becomes, the more restricted are the opportunities for individual discussion. The more common form of oral communication today is the business conference. Unless extremely well planned and skillfully directed, conferences can prove to be rather frustrating experiences to all participants, but, when properly organized, a conference provides the management-oriented accountant with the opportunity to display his fund of knowledge to best advantage and to prove himself an extremely valuable person in assisting top management in planning, co-ordinating, and controlling all company activities.

Being the primary vehicles of information, written reports have tremendously increased the paper-work load, much of it unnecessary, much of it worthless, and all of it expensive to create and to handle. What is urgently needed in most companies is a distillation of the voluminous reports to their essentials. There is no single technique that will reduce the volume of reports and at the same time increase their effectiveness and usefulness to management. Generally speaking, however, an effective reporting system has the following characteristics:

1. Reporting by responsibilities.
2. Reporting by exception.
3. Timeliness.
4. Increasing the summary data and decreasing the detail at each successive level of management.
5. Targets and yardsticks against which to measure performance.
6. Utilization of charts and graphs.
7. Interpretative comment in written or oral form, brief and concise, to highlight the salient features of the story told in figures and symbols in the reports and statistical tabulations.

Nothing contributes more to generating a disregard for reports than cluttering them up with figures which the person receiving the report cannot quickly digest or which do not pertain to the operations involving his direct or indirect responsibility and control. To implement this principle of reporting by responsibility it is necessary to adhere to sound organizational lines and to exercise sufficient ingenuity and imagination so as to develop, in close co-operation with responsible key personnel at all levels, the essentials of their responsibilities and the most useful form of reporting on them. Particularly at the higher levels of management, it is extremely important that reports point directly to responsibility for performance.

Reports should be so organized that management can readily see where performance was much better or much worse than expected. Management should not be required to plough through and analyze a large volume of figures, many of which do not require its attention. The principle involved in presenting information in this manner is known as reporting by exception, its ultimate objective being to preserve the time and mental energy

of management for purposeful, creative thinking. In applying the exception principle, normal or routine matters are given little prominence, while unusual or exceptional situations are stressed. If there are no exceptions to report, it is well to say so in a brief transmittal letter or other appropriate memorandum in order not to waste the executive's time to ascertain for himself what he could have been told in a few words in the first place.

Timeliness is the essence in reporting. The ineffectiveness of some reporting schemes, and in fact of the whole accounting function as far as its current value to management is concerned, is often traceable to the great delays in getting the information to those expected to act upon it. Accounting frills which preclude a vital report from being issued until the last insignificant accrual or transaction has been recorded and distributed over a score of accounts; lack of the use of reasonable estimates to save time needlessly consumed in waiting for actual figures which do not mean very much; antiquated methods of assembling and processing vital information—these are among the principal reasons for laboriously prepared reports becoming mementos of wasted effort because they came out too late to do management any good.

Another frequently encountered defect is the unimaginative approach of trying to report everything to everybody in the same detailed fashion. The significance of reported information varies, of course, with the function of the individuals, their responsibilities, and their position on the management scale. As a rule, each successive level of management is less interested in details but more interested in summaries covering broader areas. It is a good idea, therefore, to begin a report with a summary that gives the gist of its contents without requiring that it be read in its entirety.

I have already dealt with the importance of introducing yardsticks or targets for comparison of expected with actual performance so that management can see almost at a glance where performance has been good or bad.

I am sure that I need not stress the effectiveness of charts and graphs in presenting information to management. These can often clearly and simply illustrate relationships that it would take pages to describe. In industry, considerable effort has in recent years been devoted to the further development and refinement of such graphi-

cal presentations as break-even charts, return on investment, and many others. They have been extremely valuable in aiding management in long- and short-range planning, in the formulation of pricing policies, sales policies, product development policies and expansion policies, in measuring more reliably and therefore controlling more effectively the over-all profitability of the enterprise as well as the profitability of its various divisions and products, and in bringing into sharper focus the areas where management action must be taken so as to maintain a sound relationship between sales volume, profits, and capital investment.

Finally, the best reporting techniques are only as good as their effectiveness in getting the story across. A report should stimulate action. Simply transmitting a report by mail or by messenger without interview, discussion, or follow-up is in a great many cases wholly inadequate. It must be recognized, however, that it is impracticable to discuss every report with every recipient, so some other way of getting the ideas across must be found. One way is by means of group meetings with individuals who have a direct interest in the reported data with a view to making sure that the report is clear to them and gives them the information they wanted. In other cases a brief, concise, written narrative, dealing only with essentials and directing attention clearly to the significant items and their relationship to management objectives, has been found extremely useful. Regardless, however, of the particular technique used, if we make sure that the men who get the reports understand them, accept them, and act on them, we have a reporting system that is an effective management tool.

CONCLUSION

These in brief are a few, and very few, of the characteristics of management-oriented accounting in industry. I should like to stress that the scope of the function of the management-oriented accountant widens in direct proportion to his success in selling himself to management. For example, management accountants in many companies today are taking the lead in introducing work measurement and work simplification programs, supervisory training programs, and a variety of other techniques designed to effect the greatest possible reductions in clerical costs and to improve

the general operating efficiency of the company. The great progress which has been made in mechanical data processing is in very large measure attributable to the initiative of accountants, both private and public, and it is because of their recognition of management's great need for better and faster data that they have contributed so much to the development and effective utilization of electronic data-processing equipment.

Management accounting is vitally concerned with establishing adequate safeguards, through the system of internal accounting control, against waste and theft of the company's assets, which in the large organization is an undertaking of immense proportions. Management-oriented accountants are also frequently called on to participate in job evaluation and salary administration programs, and it is they who in the great majority of cases are the organizers and subsequent directors of internal groups of specialists such as internal auditors, internal methods men, tax units, and others.

It is fairly certain that, as far as the American manager is concerned, new demands will be made on his ingenuity and initiative and that he will need all the assistance he can get in maintaining his leadership in a world of free enterprise and increased social responsibilities. Thus, the opportunities for forward-looking accountants in private industry, in public practice, and in the federal government to exercise their best technical skills for creative and imaginative thinking and for proving themselves indispensable to management will be greater than ever before.

Edward J. Phillippe

Reports Which Give Effect to Responsibility Accounting

In large enterprises today, whether public or private, responsibilities for operations are delegated. Typically each distinct phase of activity is organized as a separate operational unit, and one individual is granted the authority to conduct its affairs within established policy guides. If over-all control and co-ordination is to be achieved, accountabilities must be established which reflect how well designated responsibilities are being discharged. To reach this objective the accounting system should be set up along the organizational lines of the enterprise, and it should provide a means for measurement of actual performance within each unit. Responsibility reports which compare actual results with budgeted or standard amounts provide the basis for control of expenditures. Such reports should be prepared for all levels of management.

Mr. Phillippe is a Manager in the Commercial Auditing Division of Arthur Andersen & Company, San Francisco, California. *This article was originally published in the November 1959 issue of the N.A.A. Bulletin.*

ONE of the most irritatingly persistent—and one of the most vital—problems which confront business management today is the question of what to do about controlling expenditures. The real need is for a tool which will identify the individuals responsible for expenditures and provide them with periodic reports on the results of their operation. Such a tool is a system of accounting

and reporting which has come to be known as "responsibility accounting."

Responsibility accounting can be described as a system of reports for all levels of management, designed to provide information which can be used to control expenditures most effectively and which directly relates the reporting of expenditures to the individuals responsible for their control. Responsibility accounting also lends itself to the operation of a good budget system. Supervisory personnel in an organization who are granted the responsibility for the expenditure of cash should also participate in the planning as to how the company's funds should be spent. If the results of this planning are to become a part of periodic reports, each responsible individual will want his expenditures to be measured against his own budget estimates. If the estimates are not his own, he will probably make little or no attempt to use the information as a means of controlling his operations. It follows, then, that a necessary step toward obtaining this objective is for each responsible individual to participate directly in forecasting his expenditures. When this approach to budgeting has been accepted, there still remains one more important step to complete the over-all responsibility concept. Actual expenditures must be reported on the same basis and using the same classifications as those used for budgeting. When this has been accomplished, the system of responsibility accounting, tailored to the company by area of responsibility identified directly from organization charts, can be most effective.

This article illustrates and explains a system of responsibility accounting and reporting for a medium-sized lumber manufacturing concern. However, these general procedures (with suitable modifications) could be applied to any type of organization. Our hypothetical company has been named XYZ Company.

AREAS OF RESPONSIBILITY IDENTIFIED BY ORGANIZATION CHART

The first major step in developing a responsibility accounting system is identifying lines of responsibility and individual responsibility areas. The organization chart developed for the XYZ Company is illustrated in Exhibit 1.

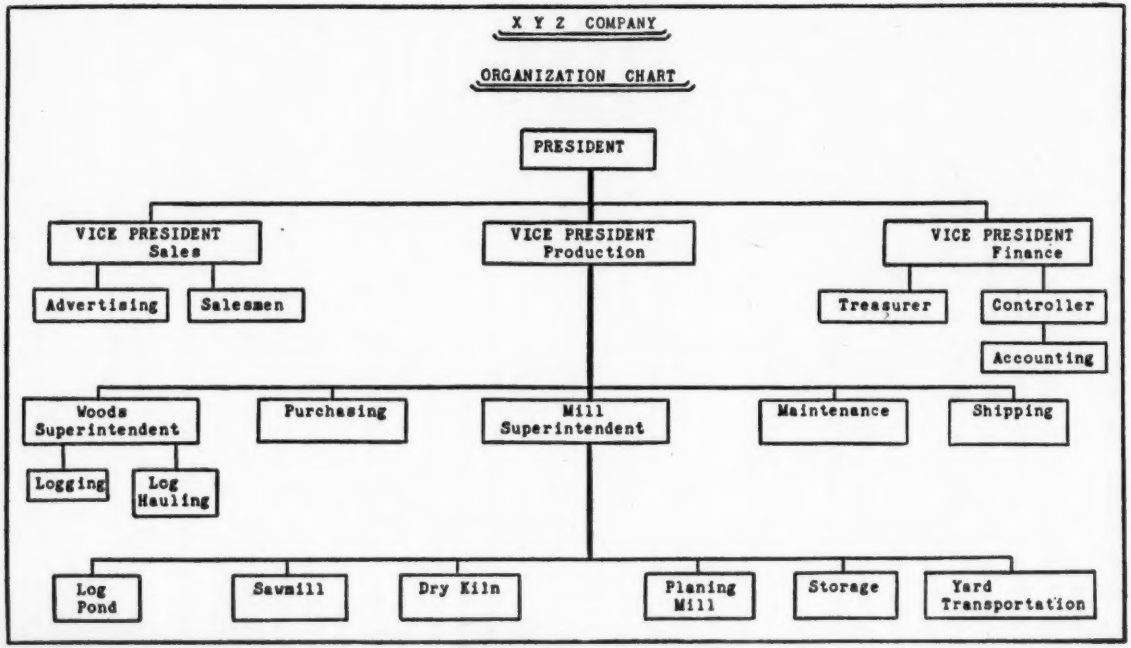
X Y Z COMPANY
ORGANIZATION CHART
PRESIDENT
VICE PRESIDENT Sales
VICE PRESIDENT Production
VICE PRESIDENT Finance
Advertising
Salesmen
Treasurer
Controller
Accounting
Woods Superintendent
Purchasing
Mill Superintendent
Maintenance
Shipping
Logging
Log Hauling
Log Pond
Sawmill
Dry Kiln
Planing Mill
Storage
Yard Transportation

Exhibit 1

This chart shows a president of a single company. It could, of course, apply to a general manager of an autonomous plant or division of a company. Reporting directly to the president are the three vice presidents, who are responsible for sales, production, and finance. The vice president in charge of production has both a woods superintendent and a mill superintendent, who are responsible for the productive departments, each of which has a foreman in charge. In addition, the service departments for maintenance, purchasing, and shipping are directly responsible to the vice president in charge of production.

ALL-LEVEL REPORTING BY PERSONALIZED STATEMENTS

The first reporting level consists of the six production departments. Exhibit 2 shows the monthly responsibility report for the foreman of the sawmill department which is one of the six production departments. Each of the departmental foremen would receive a similar report, but for purposes of illustration only one depart-

Exhibit 1

Exhibit 2

SAWMILL DEPARTMENT

	Amount		(Over) or under budget	
	This month	Year to date	This month	Year to date
Foreman's office				
Supervision	$ 600	$ 4,025	$ (40)	$ (150)
Clerical	300	1,530	(25)	(110)
Timekeeping	350	3,090	(30)	(210)
Bull chain	3,055	24,000	340	1,000
Head rig	20,380	143,660	(2,255)	(3,995)
Pony rig	10,215	73,450	505	1,015
Trimmer	12,225	89,005	895	(1,550)
Edger	5,660	32,175	(180)	595
Resaw	9,680	66,330	500	1,435
Gang saw	3,445	36,400	780	1,865
Green chain	18,450	128,985	(2,475)	(5,590)
Total	$84,360	$602,650	$(1,985)	$(5,695)

ment is shown. The expenses reported in the amount column for each operation are the expenditures for which the sawmill foreman is held responsible by the management. These actual expenses are compared with the budgeted expenses. In addition, the foreman is furnished detailed statements which are not illustrated here, showing labor and other direct expenditures for each function listed on this report. The classifications are flexible, so that classifications used in one productive department need not be the same as those of another. The report to each foreman may show his expenses in the detail and classification that he believes to be

Exhibit 3

LUMBER MANUFACTURING DEPARTMENT SUMMARY

	Amount		(Over) or under budget	
	This month	Year to date	This month	Year to date
Superintendent's office				
Supervision	$ 1,000	$ 7,200	$ (20)	$ (200)
Clerical	550	3,950	(40)	20
Log pond	5,770	47,635	445	2,310
Sawmill	84,360	602,650	(1,985)	(5,695)
Dry kiln	23,375	174,465	2,750	6,455
Planing mill	76,770	528,890	3,655	775
Storage	7,425	56,480	(715)	(2,350)
Yard	20,985	135,920	(1,470)	(3,975)
Total	$220,235	$1,557,190	$2,620	$(2,660)

PRODUCTION STATISTICS

	This month		Year to date	
	Quantity	Per M	Quantity	Per M
Sawmill	15,338 M	$5.50	104,085 M	$5.79
Dry kiln	9,541 M	2.45	85,943 M	2.03
Planing mill	12,147 M	6.32	88,591 M	5.97

most useful to him in controlling his own expense. Also, productive statistics, such as productive labor, can be furnished as the foreman desires.

The second reporting level is that of the mill superintendent. Lumber Manufacturing Department Summary, Exhibit 3 is directed to this superintendent. The total amount of $84,360, representing the total expenditures for the month in the sawmill department, has been carried forward to this report. Also, the total expenditures have been carried forward from other departments for which the mill superintendent is held responsible. Since the mill superintendent is also responsible for the expenses of his own office, these expenses are shown on this report and are supported by a detailed statement which is not shown here. The bottom section of the report contains production statistics showing the quantity produced and costs measured in thousand board feet (per M). The reporting of these statistics is deemed necessary by the superintendent so that he can effectively evaluate the performance of these operations. The Production Department Expense Summary, Exhibit 4, is for the vice president in charge of production. The total amounts of expenditures for the mill super-

Exhibit 4

PRODUCTION DEPARTMENT EXPENSE SUMMARY

	Amount		(Over) or under budget	
	This month	Year to date	This month	Year to date
Vice Presidents' office	$ 2,740	$ 16,370	$ (140)	$ (710)
Woods superintendent	193,255	1,288,540	(7,570)	(25,775)
Mill superintendent	220,235	1,557,190	2,620	(2,660)
Maintenance	12,920	77,975	1,755	6,015
Purchasing	6,530	41,610	160	150
Shipping	20,465	154,220	(1,920)	(7,365)
Total	$456,145	$3,135,905	$(5,095)	$(30,345)

intendent have been carried forward as one of the areas for which the vice president in charge of production is held responsible. The other areas of responsibility for the vice president of production are also shown. The expenses of the vice president's own office are set forth in total and, when combined with the expenditures of all other areas, the final total includes all expenses for which the vice president is accountable.

The statement for the top level of management, the president, is the final link in the chain of responsibility reports. The Departmental Expense Summary, Exhibit 5, is a concise summary of the entire company with respect to departmental expenditures by comparing actual with budget. Note that, since our responsibility reporting is tailored to the XYZ Company's operations, the side captions relate directly to our organization chart.

Exhibit 5

DEPARTMENTAL EXPENSE SUMMARY

	Amount		(Over) or under budget	
	This month	Year to date	This month	Year to date
President's office	$ 9,750	$ 67,430	$ 250	$ 930
V.P. production	456,145	3,135,905	(5,095)	(30,345)
V.P. sales	14,475	97,410	1,650	(6,735)
V.P. finance	8,980	56,125	(555)	2,605
Total departmental expenses	$489,350	$3,356,870	$(3,750)	$(33,545)

This report for the top level of responsibility presents in summary form the totals of expenditures for which the respective department heads are held responsible. Before preparing the conventional financial statements, we must combine this total with the expenses not assigned to departments, such as depreciation, taxes, and insurance. These expenses cannot be defined as being controllable by departmental supervisors and, therefore, have not been assigned to any particular responsibility area for reporting

purposes. The resulting combined amount represents the total operating expenses incurred for the period. After adding the cost of logs, customary accounting allocations are applied to this total to derive product cost, inventory pricing data, and the like, necessary for conventional financial statement preparation and tax purposes.

CONCLUSION

In closing, I would like to point out that responsibility accounting is primarily a change in emphasis from product cost reporting to the more fundamental cost control aspects of accounting. It is a system which stresses information that is useful to operating management and assists them in solving the problem of what to do about controlling expenditures.

George W. Gershefski

New Departures for Operations Problems

Operations research is an analytical approach to the solution of complex operational and planning problems which have many variables. By the use of simulation and electronic computers, the cause and effect relationships of these variable factors can be considered simultaneously, thus providing a basis for decision that otherwise would not be possible. The operations research approach to problem solutions includes five distinct phases: (1) definition of the problem, (2) collection of data, (3) development of a mathematical model, (4) tests of the model, and (5) use of the model in decision making. Since it is possible to include in the model more of the factors actually present in the business situation, the number of "intangibles" which have to be considered is reduced. As a consequence, better decisions can be made. The operations research approach not only provides answers to specific problems, but also contributes to the development of a better understanding of the operations of an enterprise and the nature of business problems confronting it.

Mr. Gershefski is Senior Engineer, Esso Research and Engineering Company, Florham Park, New Jersey. This article is based upon an address given before the Federal Government Accountants Association at Washington, D.C., in November 1959.

OPERATIONS research is an advanced analytical approach which can aid long-term business planning or the solution of daily operating problems. Its main objective is to provide management

with a scientific analysis of the "cause-and-effect" relationships of a specific situation. It is then possible for them to blend this scientific information with such intangibles as general business conditions, politics, and psychology to arrive at a final decision.

Operations research can be considered as a method of expanding the number of factors that can be considered simultaneously when arriving at a decision. For years, assistance of this type has certainly been the objective of consultants and of various engineering groups. The major difference, however, between the work of most of these people and operations research is in terms of the approach and the techniques used. The characteristics of operations research are that it (1) applies the "scientific method" to the solution of business problems more rigorously and (2) uses advanced mathematical, statistical, and computer techniques to aid analysis when necessary. Let us consider these points in greater detail.

THE OPERATIONS RESEARCH APPROACH

The exact steps followed in investigating a particular problem certainly depend not only on the factors to be considered, but also on the type of answer desired and the time available. The approach outlined below, as an example, is typical of that which has already been used to solve several operations research problems. These five steps will be described in turn:

1. Define the problem and set limits and objectives.
2. Collect data and analyze.
3. Develop a mathematical model of the situation.
4. Test the accuracy of the model.
5. Use the model.

The O.R. approach is very general and can be used for many problems. However, as a means for aiding continuity and understanding, the discussion here illustrates an oil terminal planning problem for determination of the number of tanker berths in relation to storage capacity at the terminal.

Define the Problem and Set Limits and Objectives

While defining the problem and setting limits and objectives may appear to be an obvious first step, thoroughness and clear thinking at this point often can determine the eventual success of the project. Once having looked into the matter of what is required

and the ability of operations research techniques to handle the job, boundaries must be defined so as to determine the scope of the project. It is here that preliminary investigations and conferences with management take place. Once the problem is clearly defined and the scope set, the other steps can follow in sequence.

A typical terminal planning problem might be stated as follows: Develop a planning tool that would depict comprehensively the numerous variables involved in the terminal operation so as to assist in determining (1) the "best" number of berths and (2) most efficient amount of terminal tankage (storage capacity at the terminal).

Collect Data and Analyze

In a problem of this type, extensive interviews of terminal personnel must be made to determine operating characteristics, tank and piping arrangements, and special problems associated with the terminal operation. Data would also be analyzed to determine the characteristics of tanker arrivals, berthing times, and loading rates.

Develop a Mathematical Model

This step (often the most difficult) is concerned with developing some sort of model which will represent and tie together the various factors involved in the terminal operation, so that their cause and effect relationship can be determined. (Models, referred to in operations research phraseology, generally take the form of mathematical equations and/or computer programs—they are different in nature but analogous to pilot plants of refinery or manufacturing processes.) The next section describes in more detail the various types of models and how they can be used and constructed.

The important characteristic of a model is that changes introduced in the model must produce much the same effect as when these changes are introduced in the real operation. For example, if the model indicates that an increased loading rate of 5,000 B/H (barrels per hour) reduces tanker waiting time by three hours per day, then in actual practice substantially the same reduction must occur. The main advantages of having a mathematical or computer model are:

1. The effect of various changes can be studied without disrupting operations or incurring unnecessary construction. For example, the effect of reducing loading rates could be studied without incurring the delays that might result.

2. The answer can be obtained in a shorter time than if actual operating data had to be collected and analyzed.

3. The model can easily be used to see how the business would react under a very wide variety of conditions.

Test the Accuracy of the Model

This step is one of the most important. It consists of determining how well the model expresses the cause and effect relationship of the variables actually involved in the operation. In this case of a marine terminal, one could feed into the computer the throughput (volume of oil shipped per day), arrival, and loading conditions of a historical period and compare tanker waiting hours obtained through the model against those experienced in actuality. If close agreement is not obtained, the model itself must be redesigned. It is this attempt to approach realism and to avoid unrealistic assumptions that often leads to models of some mathematical complexity.

Use the Model

The developed model can be used with confidence to study the effect of changes in operating practices or the physical facilities of the terminal. Graphical or other numerical representations can be constructed showing the effect of throughput, number of berths, and amount of tankage on tanker waiting time. The job is not complete until results have been translated into meaningful and practical form. Figure 1, in the form of a graph, shows that with only one berth available at the terminal, waiting time would increase very rapidly when the terminal throughput reached a certain point. The effect of a second berth is also shown. (For a specific terminal, the actual magnitude of the variables would, of course, be indicated.)

The important points to note in this process are (and these points are not limited to the terminal problem described above, but are true for most operations research studies): A model is

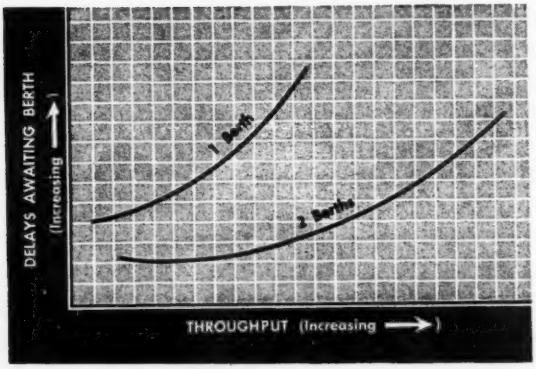

Figure 1

developed—using any mathematical or computer technique required—which depicts the cause and effect relationship of the variables considered important to the problem. The model is then tested. This is where the "scientific" method comes into play.

To be sure, in actual practice, the approach may be modified to adjust for the size, scope, and economic consequences of any particular problem. In some cases, for example, the collection of data and its analyses are sufficient; in others, a more thorough economic analysis may be required.

ILLUSTRATIVE PROBLEM

Because of the basic importance of models in really understanding operations research and how it is performed, alternative models which might be used to solve a particular problem are described in the pages that follow.

Consider, as an example, a very simple problem: At a marine terminal having only one tanker berth, tankers arrive to load crude oil. What effect will the addition of a second berth have on ship waiting time?

This problem, as stated, has been simplified for purposes of illustration. The basic problem, however, is of real importance to terminal planners. They must know how many berths to build so as to handle the anticipated traffic. On the one hand, building too many would be extremely expensive and, on the other hand,

building too few (thus incurring excessive tanker waiting time) would also be extremely expensive.

Conventional methods of solving this problem often center about a "berth occupancy" or "use factor." The results of using this basis have not always proved to be satisfactory. Operations research has been able, through the methods outlined below, to arrive at more accurate answers than hitherto possible. It must be stressed, again, that this example is greatly simplified, so as to describe more easily some of the various types of models used in operations research.

Solution 1. Formula Model

The formula below was developed with the use of advanced mathematics. It will hold true if the following conditions are met:

1. A large number of different ships use the terminal.
2. The tankers arrive without any specific pattern.
3. All vessels that arrive are loaded on a "first-come, first-served" basis.
4. Variations in time required to load follow a particular pattern.

If these conditions are met, the average time that a tanker will be required to wait can be determined by solving the formula. (One of the contributions of operations research is the developing of formulas to fit business situations.)

For expression of these relationships in a formula, let: W = average waiting time per ship in days; λ = average tanker arrival rate, ships per day; μ = average time to load, ships per day for one berth; c = number of berths; and $\rho = \lambda/c\mu$. Then

$$W = \frac{(\rho c)^{c+1}}{\lambda\,(c-1)!\sum_{n=o}^{c}\frac{(\rho c)^n}{n!}\left[(c-n)^2-n\right]}.$$

The effect of adding a second berth on ship waiting time can be determined by substituting the proper values into this formula model (first with $c = 1$, then with $c = 2$). Although this is relatively easy to do, the question still remains as to whether this formula is a good model of the terminal. The answer will be yes, only if

the assumptions concerning the "pattern" of arrivals and tanker loading used in developing the formula are met at that particular terminal.

Actual experience has shown that this formula represents adequately some terminals. In other cases a formula may not fit. For instance, if additional variables are introduced (such as restricted anchorage space, limitations on night navigation, docking only at certain stages of the tide, etc.), it would be very difficult—perhaps even impossible—to develop a formula model which would fit such an involved situation. Alternative methods of solution are replication models and Monte Carlo models.

Solution 2. Replication Model

The replication model works this way: It reviews historical data to determine the sequence and timing of events so as to use the past data as an input to a system and then note the numerical value of an item required for analysis. To clarify this, suppose that the observed data on past ship arrivals and loading time at the terminal were as shown in Figure 2. It can be seen in this simple

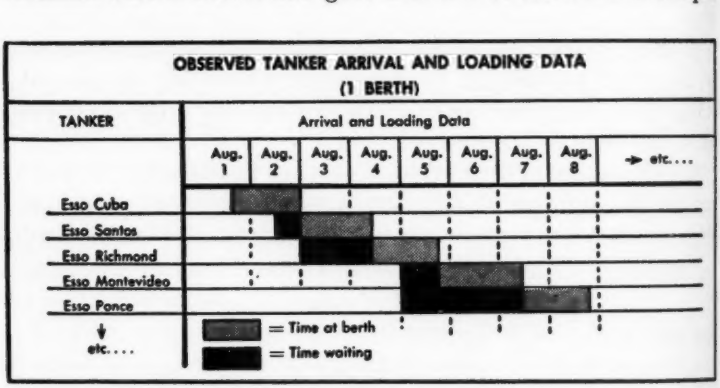

Figure 2

example that the Esso Santos arrived at noon on August 2, waited until midnight to start loading at Berth 1, and finally departed before noon on August 4. The average time a ship spends waiting at the terminal can be determined easily by adding and averaging this past experience. The effect of a second berth could be deter-

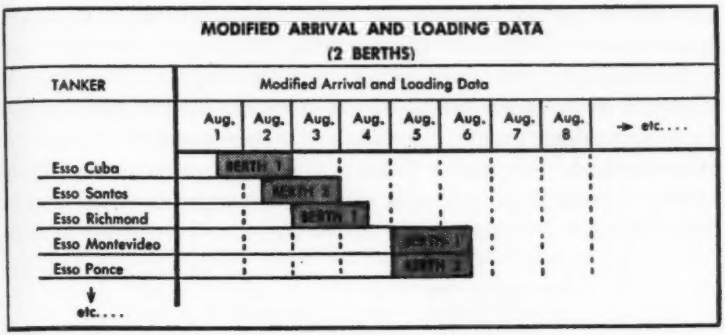

Figure 3

mined by using the same arrival and loading data and allocating the ships to either one of the two berths as they become available. This new allocation, incorporating a second berth, is shown in Figure 3. In this case, it can be seen that when the Esso Santos arrived it could have gone immediately into Berth 2. Again, one can estimate the time spent waiting at the terminal and hence evaluate the effect on tanker waiting time of building a second berth. The nice thing about this type of model is that it is not necessary to make any assumptions about the pattern of arrivals and loading. Actual past occurrences are used to provide this information. If it is likely that the same pattern will prevail in the future, and if all pertinent variables can be taken into consideration, then this approach can be extremely useful.

When neither the formula model nor the replication model apply, the Monte Carlo model may provide the solution.

Solution 3. Monte Carlo Model

In the example above, the actual arrival and loading data observed were used as a basis for arriving at an answer. Under certain circumstances, where, for instance, there may be no past experience to draw upon, as would be the case in planning a new terminal, or in other cases where extreme complexity is involved, it might be better to develop a hypothetical or fictitious pattern of arrivals and loadings. The result of using this hypothetical pattern, which may be suggested by experience at similar terminals, will be

valid if this pattern has the same underlying properties as the anticipated future arrivals at the terminal.

For example, one could start by representing the time between tanker arrivals by the method used in Figure 4. This figure shows in a convenient way the probability of any particular "time-between-arrivals" happening. (This type of diagram is called a "Probability Distribution.") In this case, for example, it states that in approximately 60 cases out of 100, the time-between-tanker arrivals

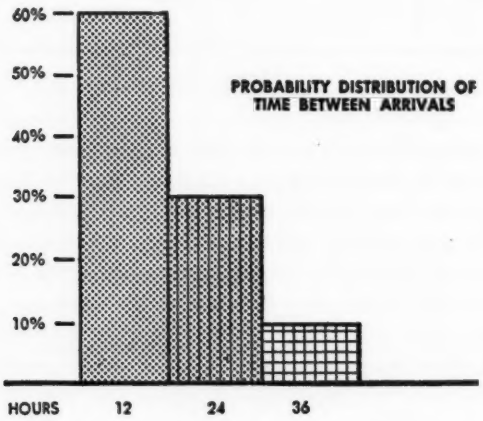

Figure 4

is 12 hours, and so on. (Twelve-hour intervals were used in this case; in practice any interval could be used.) At this point the percentage of time in which an event occurs is known, however the sequence (e.g., 12, 12, 24 or 24, 24, 12, etc.) of those events must be determined. One way of generating a hypothetical sequence of arrivals would be first to let the numbers between 1 and 60 represent a period of 12 hours between tanker arrivals; the numbers 61 to 90 represent 24 hours between arrivals; and numbers between 91 and 100 represent 36 hours between arrivals.

Thus, the numbers from 1 to 100 represent the probability of any particular time between arrivals and they conform to the situation shown by the probability distribution diagram. Having assigned these numbers to represent a certain time between ar-

rivals, the numbers can then be drawn by a random chance—say, out of a hat—to generate an arrival pattern. If, for example, the number 47 were drawn, that would indicate a "time-between-arrivals" of 12 hours. If more numbers were drawn the pattern of arrivals in Figure 5 might be obtained. In this case, for example,

GENERATED TANKER ARRIVAL PATTERN

(ASSUMED STARTING TIME: 1200, AUGUST 1)

Number Drawn at Random	Time Between Arrivals	Time of Last Arrival	Arrival Time
36	12	1200, Aug. 1	2400, Aug. 1
80	24	2400, Aug. 1	2400, Aug. 2
25	12	2400, Aug. 2	1200, Aug. 3
31	12	1200, Aug. 3	2400, Aug. 3
etc. . . .			

Figure 5

the initial arrival time (an assumed time used to provide a starting point) was 12:00 on August 1, and the time to the next arrival was 12 hours. This places the next arrival at 24:00 on August 1, and so on.

Just as in the replication model, to solve the problem it is necessary to know both the tanker arrival time and time at berth. The time required to load each tanker could also be determined by sampling at random from a probability distribution of loading times. This being done, one has really generated a body of tanker arrival and loading data which can then be analyzed in much the same manner as that used for the actual historical data by the replication model (Figure 3).

The use of chance is justifiable providing a large number of samples are drawn at random (in practice, enough to simulate at least a year's operation). The important thing to bear in mind is that if the model is correct the combined effect of all arrivals as generated by chance will be very nearly the same as the combined effect of all arrivals occurring in actuality. When viewed in this

manner, it becomes apparent that the particular arrival time assigned to any one particular ship has no bearing on the final answer. Only the combined effect is important. Electronic computers can generate a year's pattern in a matter of minutes. Consequently, extensions of this type of approach have proved to be very valuable in the actual analysis of terminal problems at Esso Pet's Fawley Terminal and Creole's Lacustre Terminal.

It should be noted here that a model of an operation need not involve a computer program—in this example, a formula, capable of being solved manually, might suffice. The need to translate a model into a computer program depends on its complexity and the use to be made of it. The computer is only another tool to be used when advantageous.

Models can be used to solve many complex problems where numerous variables are involved. By way of example, the factors shown below are typical of those which were actually considered in one Monte Carlo model.[1] (The reader will recognize that the problem is much more advanced than the one described.)

Typical factors specified as input	*Typical output of model*
Arrival pattern of tankers	Tanker waiting hours by class of vessel and caused delay
Tanker sizes	Required changes in tanker allocation slates
Tanker loading rates	Crude shut in
Berths	Crude degradation required
Berthing time	Inventory levels, all grades
Size and crude allocation of each tank	Number of times a tank is swung over from one crude to another
Fill and suction line manifolding	Berth utilization
Crude metering facilities	Line utilization
Crude production rates	
Pipeline pumping capacity	
Field tankage	

SELECTION OF MODEL

The problems discussed above have been fairly simple, the approach straightforward. In reality the way of approaching a

[1]The model referred to is being constructed by Esso Research and Engineering Company for Creole's Lacustre Terminal at La Salina, Venezuela. This model is almost completely developed and tested at this time.

problem and determining the type of model to use depends on the problem or business to be simulated (size of operation, number of variables involved, amount of variation present, day-to-day operating, or planning use?), the amount and reliability of data (sufficient to study past behavior, changes, and interrelationships?), the type of answer desired (a "best" solution, a case study tool, or useful graphs?), the availability of computing facilities (can complex formulas be easily evaluated?), and the suitability of various mathematical formulations (allocation problems solved by linear programming, inventory control problem solved by Markov theory, congestion problem solved by queuing theory, scheduling problem solved by network analysis, competitive problem solved by game theory, etc.)

The essential point is that changes introduced in the model must produce nearly the same effect as if they were introduced in the business situation itself.

SUMMARY

In summary, operations research is an analytical approach which can often aid in the solution of business planning and operating problems. Its chief characteristics are as follows: (1) A scientific analysis is made of the cause-and-effect relationship of many of the important variables in a problem. This analysis tends to narrow the range of "intangibles" that have to be considered by management in making a decision. (2) The latest advances in mathematics, statistics, and computer technology are used to develop a model of the business. Recent advances in these fields make the approach especially useful when there are many variables to consider, and/or these variables themselves vary over a wide range. Specifically, modern electronic computers can solve in a matter of minutes mathematical problems which, when attempted otherwise, might take days. (3) The approach is often concerned with getting not only "an answer" to a problem (many answers may be feasible), but also a basic understanding of the operation and the variables involved so that the "best" answer can be obtained.

Although this is a relatively new field, many successful applications have already been made. As time goes on, people working

in operations research are developing both a firmer understanding of the nature of business problems and of the capability of various types of models to cope with the problems presented. The result of this activity has been an increased ability to aid management by providing factual, objective analyses as a basis for policy-making decisions.

Objectives of the Joint Financial Management Improvement Program

This statement is an excerpt from a pamphlet issued by the Bureau of the Budget, Treasury Department, and the General Accounting Office, The Joint Program for Improving Accounting in the Federal Government, May 1958, 26 pages.

WHAT ARE THE OBJECTIVES OF THE PROGRAM?

The basic goal of the Program is the improvement of financial management practices throughout the Government in a manner that will satisfy the management needs of the executive and legislative branches and the existing legal requirements. The current objectives include the following:

1. Strengthening of agency organization and staff facilities to provide for the most effective conduct of agency financial management.
2. Establishment of effective agency accounting systems on an accrual basis to the fullest extent this accounting basis is appropriate.
3. Establishment of monetary property accounting as an integral part of agency accounting systems.
4. Establishment of cost-based budgeting practices effectively integrated with the accounts to provide adequate support for budget requests.
5. Simplification of agency appropriation and allotment structures, and development of the most effective methods of control of appropriations, funds, obligations, expenditures, and costs.
6. The use of consistent classifications to bring about effective co-

ordination of agency programing, budgeting, accounting, and reporting practices.

7. Establishment of suitable internal control practices, including internal audit, in the agencies.

8. Effective integration of agency accounting and reporting with the requirements of the budget process and the central accounting and reporting of the Treasury Department.

9. Development of accurate and useful agency and Government-wide reports on fiscal status, financial results of operations, and cost of agency performance of assigned functions.

10. Education of personnel in effective maintenance and maximum utilization of these management tools to effect economy in Government operations. [Pp. 4–5]

Herschel C. Walling

Technical Accounting Developments

THE BUDGET FOR FISCAL 1961

THE President submitted the Budget for the fiscal year 1961 to the Congress on January 18, 1960. The Budget Message of the President again contained several recommendations for improving control over the Budget. The following passages are quoted from this section of the Budget Message:

Improvements in Budgeting, Organization, and Management

The decisions made by Government are vital to so many aspects of our national life that improvement of the procedures through which these decisions are made should be a continuing major goal. A substantial number of important specific steps can and should be taken to improve these practices.

Revisions in authorization and appropriation procedure.—Contract authority and authorizations to spend from debt receipts in basic legislation outside the appropriation process are generally inconsistent with sound standards of budget practice. The recommendations being placed before the Congress in this budget are based upon the principle that authority to make budget obligations and expenditures, whether financed from receipts or borrowing, should be granted by the Congress only in appropriation acts.

The Congress has shown a growing tendency to require the annual

enactment of authorizing legislation before appropriations may be made. Space programs, some mutual security programs, military and atomic energy construction in this budget, and much of defense procurement beginning in fiscal 1962, will require separate authorizations before appropriations can be considered. Under this procedure these programs receive a duplicating review each year. At the same time the value of legislative consideration and expression of long-range program objectives and amounts is largely lost, and agency personnel devote an inordinate amount of time to the congressional process at the expense of effective administration of the continuing program. I hope the Congress will find it possible generally to make authorizing legislation cover program requirements for longer periods of time. . . .

Before the executive budget is presented to Congress annually, the most careful consideration is given to the relationships of spending to receipts and borrowing, and to relative priorities of various programs. When the budget reaches the Congress, however, its consideration is usually fragmented because of the distribution of responsibilities among the various committees and subcommittees. I believe that the Congress should find means by which it can more effectively examine the budget as a whole and base its actions on the overall fiscal situation.

Provision for item veto.—In passing the Alaska and Hawaii statehood acts, the Congress again recognized the value of an item veto by a chief executive by approving provision for its use in their State constitutions. Forty-one State Governors now have item veto authority. Many Presidents have recommended it, but the Congress has not yet granted the President of the United States that power. I again recommend it.

Control of foreign currencies.—The Government receives from its operations considerable quantities of foreign currencies each year. Much of this currency is earmarked for grants to and loans in the country concerned, and some is available for programs of the U. S. Government. In many countries the currencies available to us are needed for conducting normal U. S. operations, yet such use is prevented in some cases by statutes or by the international agreements under which the currencies are received. . . .

Improved funding for public enterprises.—Major business-type activities of the Government should, with few exceptions, operate on a self-sustaining basis. Their budgets and accounts should permit ready comparison of their expenses and revenues. They should have simplicity in their financing structure and the flexibility in expenditures necessary to meet unforeseen business conditions, but should be expected to keep their obligations and expenditures within the resources provided by

Congress for that purpose, and should be subject to annual review and control by the Congress. Accordingly, I recommend that the Rural Electrification Administration, the Farmers Home Administration, the Bureau of Reclamation, the power-marketing agencies of the Department of the Interior, and the loan guarantee programs of the Veterans Administration be financed through revolving funds. Similar recommendations may be made in due time for other business-type activities.

Legislation is again being recommended to bring under budget review the activities of those few Government corporations which are now exempt from such review, but possess authority to draw money from the Treasury or to commit the Treasury for future expenditures. This can best be done by including them under the budget provisions of the Government Corporation Control Act.

Revision of budget presentation.—In this budget more than half of the 626 appropriation accounts of the executive branch have been presented on a cost basis. The remaining appropriations, including those for the Department of Defense, will be converted to this basis as soon as possible. This budget also provides for accrued expenditure limitations for 12 appropriations, in accordance with legislation enacted in 1958. Such limitations are recommended to permit closer congressional control over annual expenditures.

JOINT PROGRAM PROGRESS REPORT

The annual report of the Joint Financial Management Improvement Program for the fiscal year 1959 was issued under date of December 15, 1959. This program was formerly known as the Joint Accounting Improvement Program. Initially it gave primary emphasis to accounting needs in the Federal Government, but it soon became apparent that coordinate improvements were also necessary in the related fields of programing, budgeting, and reporting—all with the objective of most effectively providing for the financial management needs of the agencies.

The Joint Program was started in 1948 by the Bureau of the Budget, the Treasury Department, and the General Accounting Office with the active participation of the administrative agencies. It is now carried on under the Budget and Accounting Procedures Act of 1950. It was accelerated in 1956, after enactment of Public Law 84-863, by an organized time-phased program aimed at comprehensive revision of agency financial management systems. This

work is carried on in a framework of broad executive branch policies and instructions issued by the Bureau of the Budget, the central accounting and reporting requirements of the Treasury Department, and the accounting principles and standards established by the General Accounting Office.

The eleventh annual progress report, for 1959, is a 164-page document in two parts. Part I covers the financial management developments of government-wide significance. The material in this part was prepared by the three central fiscal agencies, together with the General Services Administration in connection with property matters.

Part II covers the agency financial management improvement program—status, accomplishments, and plans. It contains a tabulation for each department and establishment showing for each bureau and office the status of its improvement plans in terms of the installation of accrual accounting and cost-based budgeting practices—techniques considered essential to the ultimate objectives of the Program. The tabulation indicates whether these goals have been reached by submission for approval or by the approval by the Comptroller General of accounting systems on the accrual basis and by adoption of cost-based budgeting for internal use and in the budget presentations. Target dates are given for work still to be done. Additional information on accomplishments during 1959 and on future plans are furnished in narrative statements.

CABINET PRESENTATION

As part of the continuing effort toward modernization of agency financial management systems, a series of charts concerning the Joint Program was developed for presentation to the President and his Cabinet. The Director of the Bureau of the Budget presented these charts to the Cabinet meeting held on July 31, 1959. The Secretary of the Treasury joined in the presentation and subsequent discussion of the subject.

The charts used before the Cabinet explained the background and nature of the Program, identified its goals, and outlined some of the benefits gained as a result of this joint endeavor. The presentation also included a general picture of the status of the executive agencies in carrying out the Program. This discussion

was later supplemented by letters from the Budget Director to the heads of the agencies represented at the Cabinet meeting. These letters discussed more specifically the significant elements of the improvement program underway in each of the agencies.

Emphasis was placed on making effective management use of the improved financial data produced by the revised systems. The agency heads were urged to continue the top-level support needed for effective improvement action and to take steps that would insure full realization of the potential benefits.

GENERAL REGULATIONS NO. 100

General Accounting Office General Regulations No. 100, "Procedure for Administrative Appropriation and Fund Accounting and Reporting," dated October 4, 1943, were rescinded on December 24, 1959, by Transmittal Sheet No. 2 for the *GAO Manual for Guidance of Federal Agencies.* This act symbolizes a far-reaching change in the legislation and philosophy underlying the manner in which agency accounting systems are prescribed by the Comptroller General.

Section 309 of the Budget and Accounting Act of 1921 provided that—

> The Comptroller General shall prescribe the forms, systems, and procedure for administrative appropriation and fund accounting in the several departments and establishments....

Pursuant to this act, the Comptroller General issued Circular No. 27 on July 21, 1926, and an appendix thereto on April 1, 1927. The circular advised the departments and establishments of the desirability of uniformity in accounting and reporting, and that systems of administrative accounts, and changes therein, were required to be approved by the Comptroller General. The appendix contained the chart, description, and method of operation of a uniform system of administrative accounts, reporting forms, and the like.

Circular No. 27 and its appendix were superseded by General Regulations No. 100 of October 4, 1943. These regulations prescribed a chart and description of accounts, pro forma journal entries, and basic accounting forms for general use. They also prescribed the form and procedures for maintaining an allotment

ledger and for maintaining accountability for U.S. Government Transportation Requests, Bills of Lading, and Tax Exemption Certificates.

The system of administrative accounts set forth in General Regulations No. 100 was prescribed "for the purpose of providing a uniform procedure for the departments, establishments, and agencies of the United States Government in recording and reporting their financial transactions...."

Soon after the Joint Program for Improving Accounting in the Federal Government was launched, the Comptroller General announced in Accounting Systems Memorandum No. 2 of June 7, 1949, that it would be his objective under the Joint Program

> to establish accounting requirements largely in terms of standards, principles and basic forms, procedures and terminology. This will be done to provide the necessary consistency, uniformity and integration of accounting and financial reporting for the Government as a whole and to provide a sound foundation for accounting development in each agency. The requirements will be such as to provide flexibility for each agency to mold and develop an accounting system and related procedures adopted to its own operations and management needs subject to constructive review by representatives of this Office.

He pointed out in this memorandum that the accomplishment of the above would result ultimately in complete substitution of new accounting regulations for General Regulations No. 100. The memorandum placed these regulations in a transitional status. They were to be regarded for the time being as a starting point for the flexible development of accounting systems to meet the needs of each individual agency.

> Present requirements of General Regulations No. 100 should not be construed as limiting or regimenting constructive accounting development in any agency. The General Accounting Office is prepared to consider any modifications, in individual circumstances, which agencies feel should be made in the interest of improving accounting from the management viewpoint.

Various types of modifications which had been found to be effective in simplifying accounting work and developing more useful accounting results were summarized in Accounting Systems Memorandum No. 7 of May 2, 1950. They were presented as information

which might be helpful to agencies in developing proposed changes in their accounting procedures for review by the General Accounting Office.

The Budget and Accounting Procedures Act of 1950 placed upon the head of each executive agency the specific responsibility for establishing and maintaining adequate systems of accounting and internal control in accordance with principles, standards, and related requirements for accounting prescribed by the Comptroller General. Accounting Principles Memorandum No. 1, "Statement of Accounting Principles and Standards for Guidance of Executive Agencies," was issued on November 26, 1952. Accounting Principles Memorandums Nos. 2, 3, and 4 subsequently amplified certain portions of the initial basic memorandum.

These principles and standards, together with illustrative accounting procedures as guides for the application of the principles and standards, are now contained in Titles 2 and 6 of the GAO Manual. Consequently, General Regulations No. 100 and the related Accounting Systems Memorandums were rescinded.

MODIFICATION OF CENTRAL ACCOUNTING PROCEDURES

The Treasury Department is considering a modification of its central accounting and reporting procedures as set forth in Treasury Circular No. 945. The agencies were advised of the proposed modification by a circular letter of November 18, 1959.

This letter indicated that staff of the Treasury Department, Bureau of the Budget, and General Accounting Office would conduct a series of informal discussions with appropriate fiscal representatives of the respective agency headquarters concerning the general objectives and procedures of a test of the proposed procedure. Further instructions regarding the test were issued in a circular of December 18, 1959, from the Fiscal Assistant Secretary to the heads of the agencies.

The proposed procedure would decentralize the accounting for receipts and expenditures by individual receipt, appropriation, and fund account to agency offices which make the deposits and certify vouchers for payment by the Treasury regional offices. These Treasury offices would maintain only a control account for

each agency accounting station, in lieu of the present subsidiary accounts for each receipt, appropriation, and fund account. Each agency station would report promptly at the end of each month to the Treasury the breakdown of its receipt, repayment, and disbursement transactions for use in the central accounts and reports. These monthly reports would be reconciled with the Treasury control accounts.

The test will cover a period of not less than three months, beginning with February 1960, and will include all agencies for which disbursing is performed by the Division of Disbursement of the Treasury. The purpose of the test is to determine whether the accounting by the agency stations can be properly integrated with the Treasury control accounts and they can make their monthly reports with the timing, completeness, and accuracy required for the issuance by the Treasury of its Monthly Statement of Receipts and Expenditures of the United States Government. The test is also intended to determine whether the proposed procedures would result in an over-all gain in efficiency, economy, or other advantage to the government as a whole. The test results will be evaluated jointly by Treasury, Bureau of the Budget, and GAO. If the revised procedures prove workable and efficient a recommendation will be made for their adoption July 1, 1960.

FINANCING THE CIVIL SERVICE RETIREMENT FUND

In its report on the Independent Offices Appropriation Bill for 1959 (S. Rept. 1656, 85th Congress), the Senate Committee on Appropriations requested the Civil Service Commission, on the basis of a quinquennial valuation as of June 30, 1958, by the Board of Actuaries of the Civil Service Retirement System, to submit recommendations, in conjunction with the Bureau of the Budget and the General Accounting Office, "for keeping the fund current and for providing on a sound basis for the future liabilities of the Government to the beneficiaries."

The General Accounting Office submitted its report to the Committee on October 27, 1959, and the Civil Service Commission and the Bureau of the Budget submitted a joint report on November 17, 1959. The Committee has published its reports and the

"Special Report of the Board of Actuaries on the Valuation of the Civil Service Retirement System, as of June 30, 1958," in a Committee Print, entitled *Civil Service Retirement System.*

Both of the reports requested by the Committee point out that the soundness of the System is dependent on the faith and credit of the United States rather than the cash or U.S. government securities in the fund. Neither report recommended increasing the present employees' contributions of 6.5 per cent, but both recommended appropriations to the Fund by the government in addition to the present agency contributions of 6.5 per cent of their covered payrolls.

The Civil Service Commission and the Bureau of the Budget recommended a permanent indefinite appropriation to the Fund to supplement the agency contributions when necessary to assure that the balance in the fund will not be reduced below the total of the amounts to the credit of the employees.

The GAO recommended that appropriations to the agencies for their contributions to the fund be increased to cover the full annual cost of the System not met by employee contributions. This would assure that the retirement costs incurred by the government each year under the System are included in the annual budget and financial reports of the government and would maintain a balance sufficient to cover all future disbursements indefinitely and substantially in excess of the balance to the credit of the employees.

Both reports recommended more frequent actuarial valuations of the System with fuller reporting on the operations and the status of the System.

ADP RESPONSIBILITIES STUDY

The Bureau of the Budget has issued "A Report of Findings and Recommendations Resulting from the Automatic Data Processing (ADP) Responsibilities Study, September 1958–June 1959." This study was a President's Management Improvement Fund Project, conducted under the direction of the Bureau of the Budget.

The objective of the study was to identify and clarify the government-wide functions performed, or to be performed, in the utili-

zation of ADP equipment and to propose assignments of the functions to specific agencies. The 44-page report proposes the following type of organization plan:

A. The Bureau of the Budget with the advice and assistance of Agencies will assert broad, general leadership and coordination of the ADP Program in the Executive Branch....

B. The National Bureau of Standards, Department of Commerce, will collaborate with the Bureau of the Budget and others in (1) coordination of ADP research and development programs, (2) developing plans for an experimental Government computer service center, and (3) if the service center plans are approved, organize and operate such a center experimentally.

C. The Bureau of the Census, Department of Commerce, will collaborate in the service center study and most likely in service center operations.

D. The National Science Foundation will advise and assist in the coordination of ADP research and development programs.

E. The Civil Service Commission will carry out its usual role as it pertains to ADP personnel management, including training.

F. The General Services Administration will carry out its usual role as it pertains to ADP equipment procurement and maintenance, paperwork management, and, to some extent, data transmission systems.

G. The Treasury Department, by virtue of its membership on the Policy Committee for the Joint Accounting Program will in collaboration with the Bureau of the Budget and the General Accounting Office assist in the formulation of policy and furnish advice and assistance on the effect of ADP utilization in accounting and financial management systems.

H. The Office of Civil and Defense Mobilization and the Department of Defense will collaborate with the Bureau of the Budget on vulnerability matters pertaining to ADP equipment.

I. All Agencies having membership on the Interagency Committee on ADP will in this way serve in an advisory capacity to the Bureau of the Budget on all Government-wide ADP problems and studies.

INTERNAL AUDIT POLICY

The Atomic Energy Commission has revised the chapter on "AEC Audit Policy" in its *AEC Manual*. This chapter establishes the policies and fundamental standards which are to govern the

audit of the operations of AEC and its cost-type contractors. A concise statement of its comprehensive internal audit policy is set forth in the following paragraph:

It is the policy of AEC that internal auditing be an element in the administration of operations performed by AEC and its cost-type contractors, exclusive of technical operations. The internal audits, in addition to ascertaining the allowability of expenditures, realization of revenues, and compliance with AEC Manual and contractual provisions, are to include reviews of the business practices and procedures which have an impact upon the financial interests of AEC, including its appropriations, funds, obligations, costs, property, and other assets. Through an examination of these practices and procedures, including a review of internal controls and of compliance with AEC policy and practice, there will be provided the essential requirements for audit determination as to whether Government funds are properly used, adequately safeguarded, and properly accounted for.

GAO MANUAL

Chapter 8000, "Integrated Accounting for an Agency Financed from Appropriations," has been added to Title 2 of the *GAO Manual for Guidance of Federal Agencies* (Transmittal Sheet No. 2–12, December 24, 1959). This is the twelfth chapter to be incorporated in Part 2 of Title 2.

Chapter 8000 illustrates integrated accounting on an accrual basis for an agency financed by an annual appropriation and some reimbursements. It is presented as a case study summarizing the procedures described in the earlier chapters. The transactions used in the case study are assumed to cover a full cycle of operations, and journal entries are given for each transaction including adjusting and closing entries. Financial statements are presented for the case study.

The journal entries, forms, and procedures set forth in chapter 8000 and the other chapters of Part 2 are not mandatory but are included in the *Manual* to explain and illustrate the application of the prescribed principles and standards in Part 1. They are intended as flexible guides for the agencies in developing accounting procedures and methods to fit their own needs subject to review and approval by the Comptroller General.

AUTOMATIC DATA PROCESSING

Annual reports on the utilization of automatic data-processing (ADP) equipment by agencies of the executive branch are required by Bureau of the Budget Bulletin No. 60-4, dated October 9, 1959. The agencies will report on or before December 31 on the ADP equipment used or to be used, the purposes served by using the equipment, and the actual or estimated costs of operation of the equipment.

COMPTROLLER FUNCTION CAREER MANAGEMENT PROGRAM

The Department of the Army has announced a program providing agency-wide career management for civilian employees in occupational fields which support the comptroller function. These fields include twenty-four different GS-series, for three of which—professional accountants (GS-510), budget analysts (GS-560), and management analysts, excepting those engaged in manpower management activities (GS-303)—the department has developed and published training plans and career patterns.

TRAINING IN USE OF STATISTICS

The Sixth U.S. Army Command, with more than seventy installations and facilities in the eight western states, has been conducting an in-service statistical analysis training program for its military and civilian supervisors since 1957. The course is designed primarily for Army executive, staff, and supervisory personnel who deal with administrative and operational data. The nonmathematical training course covers the principles of basic statistical theory, methods of computing and interpreting data, and tabular and graphical presentation of data. The course is conducted by the lecture and discussion method. Sixteen sessions of two hours each are held in a three-week period. Classes have been held at headquarters and at all major installations.

H. Edward Breen

Current Publications

BOOKS AND PAMPHLETS

Dickey, Robert I., ed. *Accountants' Cost Handbook.* New York: Ronald Press, 1960. 1,050 pp. $15.00.

The editor with a board of twenty-two assistant editors has compiled the accumulated experience of American industry directly applicable to every cost problem.

The second edition, a virtual library on costs, contains twenty integrated sections emphasizing the human factor in effective cost control. The handbook is designed to give the complete answer to any question in a time-saving logically integrated presentation.

National Association of Accountants, Research Project Committee. *Return on Capital as a Guide to Managerial Decisions.* (N.A.A. Research Project 35.) New York: The Association, 1959. 107 pp. $2.50.

"A few companies have long used rate of return on capital as a guide to management for reviewing past performance and for appraising proposed plans and projects. In recent years, interest in rate of return as a management tool has spread rapidly. In the course of this development, different concepts of rate of return have appeared and numerous variations in methods for ascertaining and using rate of return are in use. The objective of this study was to review these concepts and methods and to evaluate them in terms of the purposes for which they are intended."

The material was obtained from field interviews with forty-four companies which use rate of return as a management tool.

The report is logically divided into two parts as follows: Part I—Rate of Return for Measuring Periodic Profit Performance; and Part II—Using Rate of Return in Capital Planning. Part I consists of the following chapters: "Determining the Capital Base on Which Rate of Return is Measured," "Determining Income Related to Capital," "Determining Return on Capital by Segments of a Company," "Analyzing Changes in Return on Capital," and "Return on Capital as a Guide in Pricing." Part II includes the following chapters: "The Financial Statement Method," "The Discounted Cash Flow Method," "Relationships between Pay-Pack Period and Rate of Return," and "Using Rate of Return in Decision Making."

ARTICLES

Bierman, Harold, Jr. "A Way of Using Direct Costing in Financial Reporting," *N.A.A. Bulletin,* 41 (Nov. 1959), 13–20.

"Fully aware of possible objections to the solution offered, the author suggests a means of eliminating distortions to income but retains conventional inventory valuation methods, thus moving cautiously ahead. The article also includes a thoughtful confrontation of pros and cons in the direct costing 'conflict'."

Blough, Carman G. "Challenges to the Accounting Profession in the United States," *Journal of Accountancy,* 108 (Dec. 1959), 37–42.

"The first technical session of the American Institute's recent annual meeting was devoted to 'New Challenges to Accounting's Basic Principles.'

"After a general discussion of the nature and history of accounting principles, Mr. Blough lists eighteen specific areas in which there is need for development of principles which will be generally accepted, or clarification of the applicability of accepted principles to specific problems or types of enterprise."

Cook, Edward T. "Revised Contract Cost Principles," *Journal of Accountancy,* 109 (Feb. 1960), 52–65.

"Important changes in Department of Defense contract cost principles were made by revision of the Armed Services Procurement Regulation last November. Significant modifications discussed include possible allowance of a use charge for fully depreciated assets, a different treatment of cash discounts lost, allowance of certain precontract costs,

and allowance for independent research costs without specific contract provisions. An item by item chart provides a convenient subject index to paragraphs 15–205 of the revised regulation."

Fitch, W. Chester. "Depreciation on Mass Properties—An Application of Statistical Concepts," *N.A.A. Bulletin,* 41 (Dec. 1959), 39–50.

The author describes a method of determining the proper amount of accumulated depreciation for property group units, overcoming deficiencies of inadequate techniques by use of easily estimated statistical measures and providing a continuing control based on improved accuracy. The author's method is illustrated graphically and proved mathematically in the article.

Flewellen, William C., Jr. "The Road to Better Collegiate Education for Accounting," *N.A.A. Bulletin,* 41 (Nov. 1959), 31–38.

"The practicing members of the accounting profession, both industrial and public, have a tremendous stake in collegiate education for accounting and in its continuing development."

The author, an educator, discusses what educators are trying to do, the evolution of curricula and standards established, the problems of staffing and practical background of the faculty, the public accounting bias, the general versus the specific in educational programs, the importance of attracting accounting majors, and the responsibility of accountants in supporting collegiate education.

Gellhorn, Walter. "Occupational Licensing—A Nationwide Dilemma," *Journal of Accountancy,* 109 (Jan. 1960), 39–45.

"A prominent professor of law argues that professional licensing, in most cases, should be directed toward preventing the use of specified titles by unqualified persons, rather than toward attempts to define and restrict activities in a professional area. He cites a wide variety of occupations which have sought licensing as a means of attaining prestige or limiting competition, while claiming to be concerned with protecting the public. In conclusion, he questions whether accountancy can be defined in exclusionary terms."

Howkins, Guerard H., Jr. "Manpower Planning—A Case Study," *N.A.A. Bulletin,* 41 (Oct. 1959), 65–72.

The author describes the process used by his company to plan manpower for a year in advance. The company consists of 38,000 employees

and twelve operating divisions. The case study describes the method used by one of the divisions to plan monthly requirements for people a year in advance. Mr. Howkins discusses the technique of manpower planning and then describes detailed planning procedures supported graphically by exhibits.

Kraayenhof, Jacob. "International Challenges for Accounting," *Journal of Accountancy,* 109 (Jan. 1960), 34–38.

"Accountants in many countries are trying to reduce areas of differences in accounting principles and practice within their own borders. To promote trade and investment throughout the free world, they should also try to achieve greater uniformity internationally."

Kraig, Harry J. "The Milepost Approach to Control of Research and Development Projects," *N.A.A. Bulletin,* 41 (Jan. 1960), 41–56.

"Projects outlined in segments, cost estimates made for each of these, basic data reduced by way of effective coding, processing and reporting confined to useful information only, with built-in measure of accomplishment—these methods, as set forth and illustrated by the author, can convert a mass of detail into small controllable pieces and provide operating control research and development cost as a by-product of cost accounting."

Lewis, Robert W. "An Industry View of Budgeting," *Journal of Accountancy,* 108 (Dec. 1959), 30–36.

"Defining a budget as 'an integrated plan of operation,' the author describes in detail the budgeting process followed in General Electric Co.

"Particular emphasis is given to elimination of unnecessary material as the budget-making process reaches top management. This is also related to the responsibility reporting system which is essential if the budget is to be a useful tool.

"After examining arguments for conservative and optimistic approaches to budgeting, it is concluded that the budget should reflect honest estimates of what is most likely to occur."

Lewis, Ronello B. "The Role of Accounting in Decision Making," *Accounting Review,* 35 (Jan. 1960), 37–44.

"Financial analysis is a service performed by the accountant for management. It is aimed at assisting management's decision-making

processes toward the goal of better profits."

In making decisions the business enterprise must choose between alternatives. "Choosing between these alternatives is the decision-making process that means the life of the business." The function of the accountant is to furnish management with all the pertinent information and to assimilate all the data and re-express them in common language and format, using similar definitions and measurement and adopting as a common denominator a comparable formula for investment, return, and profit.

The author then discusses some of the common mistakes that business is making today: sending good money after bad, making decisions by default, reaching the right decision too late, the common mistake of overdiversification the opposite error of underdiversification, and the perverse error of overretrenchment. The author then sets forth a ten-point check list for the financial analyst.

McCullough, Thomas E. "The Auditor Uses the Computer," *Internal Auditor,* 16 (Dec. 1959), 34–38.

The author states that "the entire concept of auditing, when exposed to a computer will be changed." The author then proceeds to give his observations concerning the use of the computer as an aid to auditing and some of the possible approaches to the audit situation.

Miller, George G. "The Controller's Relationship to Managerial Planning, Organizing and Controlling," *The Controller,* 27 (1959), 552–557.

"Great strides have been made in determining the controller's position in management and in describing his basic duties. It is apparent that the controller's organization has become a top-management staff control agency, but it is not so apparent that business executives understand its relationship to them."

The question of the controller's relationship to the executive's functions of planning, organizing, and controlling is discussed in this article. It develops a frame of reference defining the controller's relationship to other organizational functions—particularly, to the individual manager's functions of planning, organizing, and controlling.

Phillippe, Edward J. "Reports Which Give Effect to Responsibility Accounting," *N.A.A. Bulletin,* 41 (Nov. 1959).

The author describes responsibility accounting "as a system of reports

for all levels of management, designed to provide information which can be used to control expenditures most effectively and which directly relates the reporting of expenditures to the individuals responsible for their control."

"This article illustrates and explains a system of responsibility accounting and reporting for a medium-sized lumber manufacturing concern. However, these general procedures (with suitable modifications) could be applied to any type of organization."

Powell, Weldon. "The Challenge to Research," *Journal of Accountancy*, 109 (Feb. 1960), 34–41.

"The chairman of the Accounting Principles Board appointed by the American Institute of CPAs outlines his views on the nature of accounting research, and how it can best contribute to the formulation of accounting principles which will be generally accepted. The discussion includes comment on the special problems of regulated industries, and the desirability or possibility of uniformity in accounting practice. This was the third paper on 'New Challenges to Accounting's Basic Principles' presented at the Institute's annual meeting last October."

Reviews of the two other articles appearing in the *Journal* in December 1959 and January 1960 are given elsewhere in this section.

Shapton, W. Robert. "Functional Measurement for 'Management by Objective,' " *N.A.A. Bulletin*, 41 (Dec. 1959), 61–72.

The approach to functional measurements set forth in this article was taken from a specific department, a decentralized operating component of a large company, and represents the experience of this specific department. "The program described ties in directly with the concept of 'management by objective', which such a program implements, and the formal system of communication, which such a program provides. The necessity of evaluating the performance of a function in terms of its own objectives is basic to functional measurements."

The author concludes by stating that "the very fact that a functional measurements program exists in an organization is a powerful stimulus for each area to do a better job today than yesterday, and a better job tomorrow than today."

Sprague, W. D. "Reliance upon Other Auditors," *Journal of Accountancy*, 109 (Feb. 1960), 29–33.

"A former member of the American Institute's committee on audit-

ing procedure considers the problems involved in a variety of circumstances in which branches or subsidiaries are audited by someone other than the auditor for the parent company. Questions discussed include: the factors involved in determining whether or not the principal auditor can express an opinion on the statements as a whole; when the principal auditor should accept the responsibility for the work of other auditors; investigation of the qualifications of other auditors; the problems in dealing with foreign auditors; and the problems of the other auditor."

Stiller, H. M. "Recent Trends and Tools in Financial Management," *N.A.A. Bulletin,* 41 (Feb. 1960), 37–46.

The author, a partner in a national public accounting firm, presents a very worth-while, provocative article describing recent trends and tools in financial management. He discusses decision making and the financial staffs of qualified, professional experts or specialists that assist the financial executives in making their decisions.

Mr. Stiller then raises the question of whether industrial organizations are tending toward centralization or decentralization and discusses financial reporting under decentralization. "The specific management techniques which have come into fashion recently, such as operations research, responsibility accounting, management by exception, return on investment measurement and direct costing are discussed in this article in contemplation of the tendency toward decentralization."

Vance, Lawrence L. "A Review of Developments in Statistical Sampling for Accountants," *Accounting Review,* 35 (Jan. 1960), 19–28.

The author states that "it is the purpose of this paper to review what has been done in a somewhat summary fashion, to describe with cases three of the important applications, and to report such trends as are discernible.

"Statistical sampling methods for accountants and auditors have been actively discussed for about 12 years. A substantial amount of experimentation has been carried on during this period, and a considerable number of successful applications have been described in part."

In summary the author states that the progress is much greater in accounting than in auditing. The applications in the area of accounting are not widespread, but they are numerous and growing. In auditing there has been substantial experimentation but very few firm conclusions.

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